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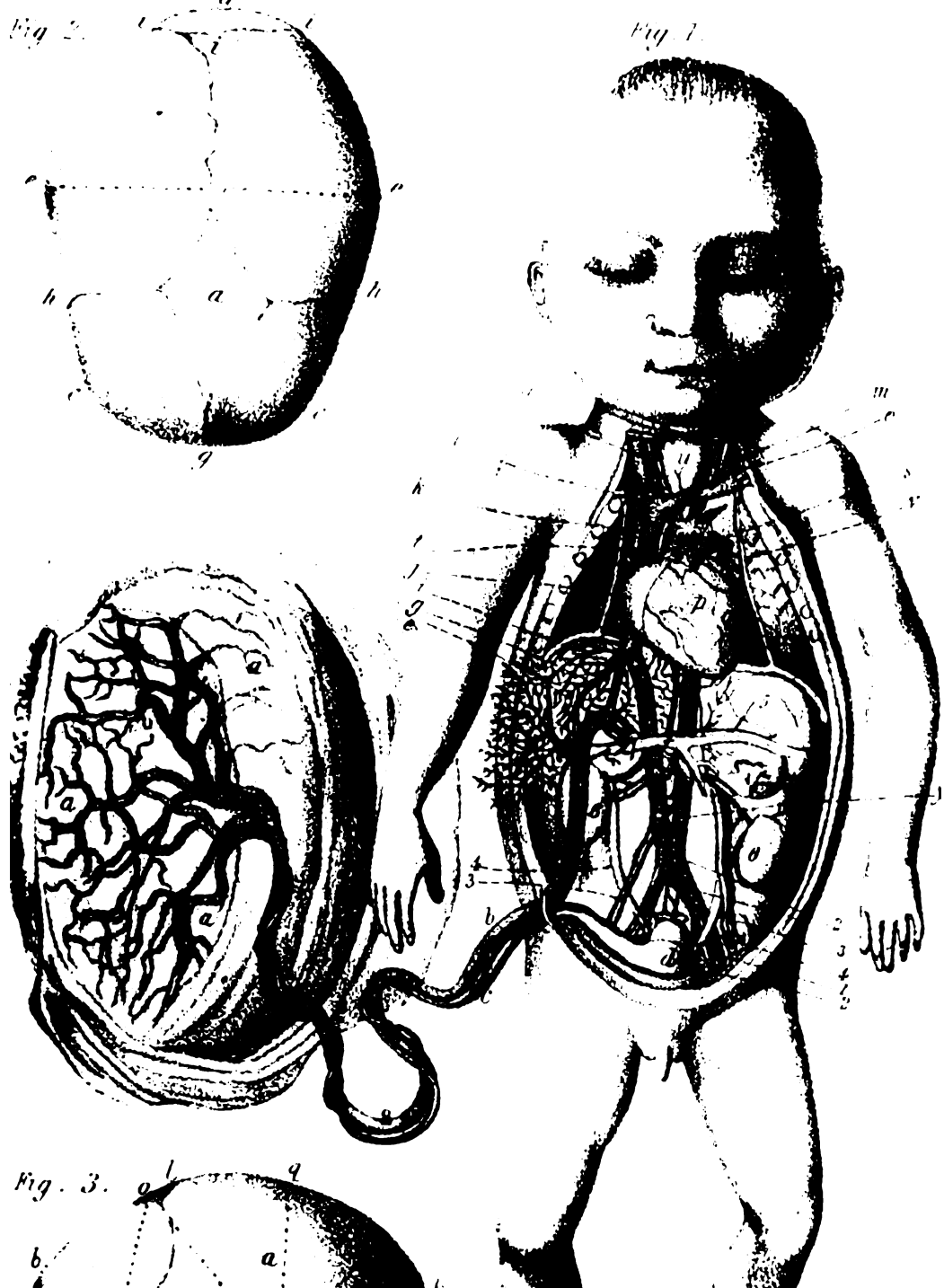
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PHILADELPHIA.

A
COMPLETE TREATISE
ON
MIDWIFERY.

A
COMPLETE TREATISE
ON
MIDWIFERY:
OR,
THE THEORY AND PRACTICE OF TOKOLOGY:

INCLUDING THE DISEASES OF
PREGNANCY, LABOR, AND THE PUERPERAL STATE.

BY
ALF. A. L. M. VELPEAU, M. D.

TRANSLATED FROM THE FRENCH,

BY
CHARLES D. MEIGS, M.D.,
MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY; PROFESSOR OF MIDWIFERY IN THE
JEFFERSON MEDICAL COLLEGE, ETC.

Fourth American, with the Additions from the last French Edition,

BY
WM. BYRD PAGE, M. D.,
LECTURER ON OBSTETRICS IN THE PHILADELPHIA MEDICAL INSTITUTE; CONSULTING
SURGEON TO THE PHILADELPHIA HOSPITAL, BLOCKLEY; MEMBER OF THE
COLLEGE OF PHYSICIANS, ETC.

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TO

PROF. CHARLES D. MEIGS, M. D.

MY DEAR DR:

The popularity of your translation of "Velpéau's Midwifery" has induced its proprietors to issue a fourth American edition, the revision and comparison of which with the last French copy have, with your approbation, been confided to me.

The additions by M. Velpéau to this edition are fully pointed out in his preface, which, together with the history of Midwifery embraced in the introduction, and the illustrations, must prove valuable to the student. Let me hope that the high reputation of this your translation, as well as that of your other valuable publications, may constantly increase, and that the precepts and practice which you have introduced and are daily promulgating to the American Medical public, may continue to exercise their beneficial influence on the progress of Midwifery and the other branches of our science.

With great respect, I remain,

Very sincerely, your friend,

WM. BYRD PAGE, M. D.,

264 Walnut St.

PHILADELPHIA, *January 1, 1852.*

*

NOTICE TO SECOND EDITION.

THE great demand for Velpeau's Midwifery, the whole of the first edition of which has been for some time exhausted, has induced its proprietor to publish a second edition. The translator has taken the liberty, which he hopes will not be displeasing to the celebrated author of the work, of adding a few notes at the foot of the page, which are marked with the initial letter M. It was with the utmost deference for the author of the volume, that, in some of these notes, he has ventured to express his dissent from a few of the opinions of one who, at the present time, stands scarcely second to any physician in Europe.

CH. D. MEIGS.

PHILADELPHIA, *April 20th*, 1838.

TO
THOMAS C. JAMES, M.D.,

PROFESSOR OF MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN
IN THE UNIVERSITY OF PENNSYLVANIA.

RESPECTED SIR:

I take the liberty of addressing the following work to you, not only for the purpose of showing my sense of your high rank and authority in the science and art so ably treated of by M. Velpeau, but also as a testimonial of my gratitude for many acts of kindness received at your hands.

I was induced to undertake the preparation of it for the American press, by a sincere desire to see so excellent a book in the hands of the profession in this country, a book which, as I think, cannot be read without exciting in the mind sentiments of great respect for the science of Tokology, as M. Velpeau denominates it, and a corresponding desire to see it advanced in all the relations of its real usefulness and dignity. I am willing to admit that we have, already, a good book in the American edition of Baudelocque's work, which, however, is but an abridgment. We have no translations of the works of Capuron, Maygrier, Gardien, Dugès, Flamant, or those admirable writings of Mesdames Lachapelle and Boivin. It did not seem improper, therefore, to add to our stock one of the most enlightened and recent of the French authorities.

M. Velpeau will readily be admitted, by those who read this volume, to be a man of talents and industry of a high order; an admission, confirmed not merely by reference to his writings, but also by the sentiments of public journalists in his own country, where the competition among men of letters is so great and stirring, that he who attains to distinction, will be, *ipso facto*, considered as having deserved it. In the republic of letters in France *palmarum qui meruit ferat* may be regarded as a maxim in daily use and practice.

The admirable composition of Dr. Denman, of which Professor Francis has lately furnished the public with an improved edition, and the systems of Burns, Ashwell, and Ryan, cannot be regarded as completely filling the chasm which has opened in the last half century between the old limits of the science and its present advanced station. I ought not in this enumeration to omit a reference to the work of Dr. Dewees, which, rich as it is in business details, and valuable for the soundness of its practical precepts, may, nevertheless, without the fear of disparagement, be considered less full and complete in regard to its anatomical and physiological features, and the ample collation of good authorities, than the volume which I have the honor to present to you. To say that Dr. Dewees's "System of Midwifery" is creditable to the science and to himself, is not enough, where it is universally admitted to be honorable to the country.

Denman, Burns, Dewees, and Velpeau will, I trust, be considered as a collection of authorities, at the least, small enough for any student or any practitioner of the delicate, difficult, and responsible Art of Midwifery: if so, I shall be absolved from the charge of adding to the number of authors, one whose works are useless or superfluous.

In relation to the manner in which I have executed my humble task, nothing ought to be said by me, further than that I have aimed to give a transcript of the author's performance, and not to substitute one of my own under his name and authority.

There are some slight errors which I shall not point out, because I presume every reader of such a work is as competent as I am to correct them: I have no excuse to offer to those who may detect them, except that the proofs have been read with much attention, and a desire to attain a great degree of correctness.

You, I hope, sir, who know how much of my time is absorbed in the business of my profession, will have the goodness to overlook all such minor faults of the translation as might naturally occur, under the circumstances in which I am placed, and accept it, and with it the assurance of my profound respect.

CH. D. MEIGS.

JANUARY 28th, 1831.

CONTENTS.

	PAGE
AUTHOR'S PREFACE	17
INTRODUCTION	21
Art. I. Importance of the science of obstetrics	21
II. Of those who ought to practice obstetrics	23
III. Historical notice	25
§ 1. Sages-femmes	25
2. Accoucheurs	27
A. Antiquity	27
B. Middle ages	28
C. Sixteenth century	29
D. Seventeenth century	30
E. Eighteenth century.—First period	33
I. France	33
II. Low Countries	34
III. England	35
IV. Germany	35
F. Eighteenth century.—Second period	35
I. France	35
II. England	36
III. Holland	37
IV. Germany	37
G. Eighteenth century.—Third period	37
I. France	37
II. England	40
III. Belgium	41
IV. Switzerland and Italy	41
V. Germany	41
H. Nineteenth century	41
I. France	41
II. Low Countries	45
III. America	45
IV. England	45
V. The Peninsula	47
VI. Switzerland and Italy	48
VII. Germany	48
§ 3. Conclusion	51

BOOK I.

ANATOMICAL DIVISION.

PART I.

OF THE PELVIS.

CHAPTER I.

NORMAL CONDITION OF THE PELVIS.

	PAGE
Sect. I.—Of the dried pelvis	55
Art. I. Of the bones of the pelvis	56
§ 1. Of the sacrum	56
2. Of the coccyx	57
3. Of the coxal bone	57
Art. II. Of the articulations, or symphyses of the pelvis	58
§ 1. Symphysis pubis	58
2. Sacro-iliac symphyses	59
3. Sacro-coccygeal symphyses	59
4. Promontory	60
Art. III. Of the pelvis in general	60
§ 1. External surface	60
2. Internal surface	60
3. Straits of the pelvis	61
A. Superior strait	61
B. Inferior strait	63
§ 4. Dimensions of the excavation	66
5. Base of the pelvis	67
6. Of the dimensions of the pelvis, unconnected with its axis or straits	68
§ 7. Differences of the pelvis, in respect to age, sex, and species	68
Sect. II.—The pelvis, and its dependencies	71
Art. I. The straits	71
II. Excavation	72
Sect. III.—Uses of the pelvis	72

CHAPTER II.

OF THE DEFORMED PELVIS.

Sect. I.—Excess of amplitude	74
II.—Deformity from want of amplitude	75
Art. I. Absolute contraction	75
II. Relative contraction	75
§ 1. Abdominal strait	75
2. Perineal strait	77
3. Excavation	78
Sect. III.—Faulty direction of the axes	79
IV.—Causes of deformities of the pelvis	80
V.—Mensuration of the pelvis	82
Art. I. External examination	82
II. Internal examination	84

PART II.
OF THE SEXUAL ORGANS.

CHAPTER I.

OF THE EXTERNAL ORGANS OF GENERATION.

	PAGE
SECT. I.—Normal state	88
Art. I. The mons veneris	88
II. The greater labia	88
III. The lesser labia	89
IV. The clitoris	90
V. The vestibule	91
VI. The urethra	91
VII. The hymen	91
§ 1. Description	91
2. Varieties	93
3. Incision	94
VIII. The myrtiliform caruncles	94
IX. Perineum, fossa navicularis, fourchette, frænum, commissure	95
SECT. II.—Abnormal state	96

CHAPTER II.

INTERNAL ORGANS OF GENERATION.

SECT. I.—Normal state	97
Art. I. The uterus	97
§ 1. External surface	98
2. Internal surface	99
3. Dimensions of the womb	100
4. Structure	100
A. Peritoneum	100
B. Internal membrane	101
C. Peculiar tissue, or parenchyma	101
Art. II. The Fallopian tubes	104
Art. III. The ovaries	105
Art. IV. The ligaments	107
§ 1. Broad ligaments	107
2. Round ligaments	107
3. Other ligaments	108
Art. V. The vagina	108

CHAPTER III.

SEXUAL ORGANS IN GENERAL.

SECT. I.—Abnormal state	111
Art. I. Appendages	111
§ 1. Ovaries	111
2. Fallopian tubes	111
Art. II. The uterus	111
§ 1. Double uterus	112
2. Various anomalies	113
A. Abnormal canal	113
Art. III. The vagina	114
§ 1. Methods of operating	115
Art. IV. Hermaphroditism	116

BOOK II.

PHYSIOLOGICAL DIVISION.

CHAPTER I.

FUNCTIONS OF THE SEXUAL ORGANS.

	PAGE
Sect. I.—Puberty	118
II.—Menstruation	118
Art. I. Eruption	119
II. Nature	121
III. Progress	122
IV. Cause and periodicity	122
V. Seat and deviation	124
VI. Cessation	125
VII. Retention	126

CHAPTER II.

OF REPRODUCTION.

Sect. I.—Preliminary views	127
II.—The different acts of reproduction	129
Art. I. The germs	129
§ 1. Of the female germ	129
2. Of the male germ	130
Art. II. Fecundation	132
§ 1. Seat	132
2. Mechanism	134
3. The corpus luteum	134
4. Artificial fecundation	134
Art. III. Conception	135

BOOK III.

GESTATION.

PART I.

OF TRUE PREGNANCY.

CHAPTER I.

OF UTERINE PREGNANCY.

Sect. I.—Simple pregnancy	138
Art. I. Anatomical changes	138
§ 1. The uterus	138
A. Volume	138
B. Form	140
C. Position	140
D. Direction	141
E. Thickness of the walls	142
F. Structure	143
G. Functions	144

CONTENTS.

XV

	PAGE
2. Appendages	145
3. Abdomen and viscera	145
4. Pelvis	146
Art. II. Sympathetic phenomena	148
III. Signs of pregnancy	150
1. Rational signs	150
2. Sensible or physical signs	152
A. The touch	152
1. Vaginal touch, or the touch properly speaking. Position of the woman	152
2. Anal touch	155
3. Abdominal touch	155
4. Ballottement and passive movements of the fœtus	157
5. Active movements of the fœtus	158
6. Auscultation	159
1. Placental sound	159
2. Cardiac sound	162
3. To determine the stage of pregnancy	165
SECT. II.—Multiple or compound pregnancy	165

CHAPTER II.

OF EXTRA-UTERINE PREGNANCY.

SECT. I.—Anatomical arrangement	167
Art. I. Of ovarian pregnancy	167
II. Abdominal or peritoneal pregnancy	168
III. Tubal pregnancy	169
IV. Interstitial pregnancy	170
V. Utero-tubal pregnancy	171
SECT. II.—Progress of extra-uterine pregnancy	171
Art. I. Causes	171
II. Signs of extra-uterine pregnancy	172
III. Termination	173
1. Death of the fœtus	174
2. Rupture of the cyst	175
SECT. III.—Treatment	175
Art. I. By incision	175
II. Gastrotomy	176
3. Incision per vaginam	177

PART II.

OF FALSE PREGNANCY.

Art. I. Retention of the menses	179
II. Diseases of the uterus and its appendages	180
III. Nervous pregnancy	181
IV. Conclusions	182

PART III.

SEX OF THE FŒTUS.

SECT. I.—Is it possible to ascertain the sex of the fœtus during pregnancy?	184
II.—Is it possible to procreate either sex at pleasure?	185
III.—Of the influence of the seasons and of public prosperity	187

BOOK IV.

OF THE HUMAN OVUM.

PART I.

APPENDAGES.

CHAPTER I.

SIMPLE PREGNANCY.

	PAGE
SECT. I.—Of the membranes	189
Art. I. Of the caduca, or anhistous membrane	189
§ 1. Formation	189
2. Disposition	190
3. Structure	191
4. Uses	192
Art. II. The chorion	192
§ 1. Primitive condition	192
2. Granulations and villousities	193
3. Thickness	193
4. Texture	193
5. Analogy	194
Art. III. The amnios	194
IV. Water of the amnios	195
SECT. II.—The vesicles	197
Art. I.—The umbilical vesicle	197
§ 1. Disposition	197
2. Situation	197
3. Pedicle	198
4. Parietes	198
5. Blood-vessels	198
6. Uses	199
Art. II. The allantois	199
§ 1. Reticulated body	200
2. Vitriform matter	200
3. Uses	201
4. Erythroid vesicle	201
Art. III. The cord and placenta	201
§ 1. Of the umbilical cord	201
A. Dimensions	201
B. Knots	202
C. Point of insertion	202
D. Development	203
E. Swellings	203
F. Composition	203
G. Lymphatic vessels	203
Art. IV. Of the placenta	205
§ 1. Disposition	205
2. Composition	206
3. Development	209
4. Insertion	209
5. Mode of union	210

CHAPTER II.

MULTIPLE PREGNANCY	212
------------------------------	-----

CHAPTER III.

EXTRA-UTERINE PREGNANCY	214
-----------------------------------	-----

PART II.

OF THE FŒTUS.

CHAPTER I.

SIMPLE PREGNANCY.

	PAGE
SECT. I.—Of the embryo	215
Art. I. The embryo in general	215
II. The spine	217
III. Of the head and organs of the senses	217
§ 1. The mouth	218
2. The nose	218
3. The eyes	218
4. The ears	219
Art. IV. Of the members	219
V. Of the coccyx and genital organs	220
VI. The umbilicus and second embryonic period	220
VII. Of the dimensions	221
SECT. II.—The fœtus	222
Art. I. Age and gradual development	222
II. Of the fœtal head at term	225
§ 1. Bones of the cranium	225
2. Sutures	226
3. Fontanelles	226
4. Regions	227
5. Form	227
6. Diameters	227
7. Circumferences	228
8. Varieties	228
9. Cephalometry	229
10. Articulation	229
Art. III.—Of the attitude and position of the fœtus	230

CHAPTER II.

COMPOUND PREGNANCY	233
------------------------------	-----

CHAPTER III.

OF SUPERFETATION.

§ 1. Death of one fœtus before full term	236
2. Unequal development of twins	237
3. Extra-uterine conception	237
4. Double uterus	238
5. Superfœtation, properly speaking	238

PART III.

PHYSIOLOGY OF THE FŒTUS.

CHAPTER I.

NUTRITION.

	PAGE
SECT. I.—At the expense of the ovum	240
Art. I. Of the liquor amnii	240
II. By the placenta	242
SECT. II.—At the expense of the mother	242
Art. I. By direct circulation	243
II. Circulation of the fœtus	246
§ 1. Arrangement of the organs	246
2. Course of the blood	247
A. In the heart	247
B. In the placenta	248
C. In the liver	249

CHAPTER II.

OF THE RESPIRATION	251
------------------------------	-----

CHAPTER III.

UTERINE VAGITUS	253
---------------------------	-----

CHAPTER IV.

OF THE VIABILITY OF THE FŒTUS	254
---	-----

PART IV.

OF THE TERM OF GESTATION.

CHAPTER I.

RETARDED BIRTHS	257
---------------------------	-----

CHAPTER II.

OF PRECOCIOUS, OR EARLY BIRTHS	261
--	-----

BOOK V.

PRACTICAL DIVISION.

PART I.

ABNORMAL PARTURITION.

CHAPTER I.

OF ABORTION.

SECT. I.—Mechanism of abortion	262
Art. I. Frequency	262
II. Causes	263

CONTENTS.

xix

	PAGE
§ 1. Predisposing causes	263
A. Diseases of women. General state	263
B. Diseases of the ovum	265
§ 2. Occasional causes	266
A. Medication	267
B. Special causes	268
C. Periodical causes	268
D. Mechanical causes	269
Art. III. Reaction	269
§ 1. Signs	269
Art. IV. Prognosis	272
V. Treatment	273

CHAPTER II.

MOLES	275
-----------------	-----

PART II.

OF LABOR.

CHAPTER I.

OF LABOR IN GENERAL.

Sect. I.—Causes	280
Art. I. Efficient causes	280
§ 1. Essential efficient causes	282
2. Accessory efficient causes	283
Art. II. Determining, or occasional causes	285
Sect. II.—Labor	288
Art. I. Precursory signs (1st stage)	289
II. Dilatation (2d stage)	290
III. Expulsion (3d stage)	291
IV. Duration of labor	293
V. Special phenomena of labor	294
§ 1. Of labor pains	294
A. Pain	294
B. Dilatation of the os uteri	298
C. Discharge of glairy mucus	300
D. Bag of waters	301

CHAPTER II.

LABOR PROPER.

Sect. I.—Of eutocia, or simple, fortunate, or spontaneous labor (natural labor of the French writers)	303
Art. I. Of natural eutocia (simple or spontaneous labor, the head of the child presenting)	306
§ 1. Presentation of the vertex	307
1. Occipito-anterior positions	311
A. First variety. Left occipito-acetabular position	311
1. Flexion	312
2. Rotation	313
3. Extension	315
4. Restitution	315
B. Second variety. Right occipito-acetabular position	316
C. Third variety. Occipito-pubic position	319
2. Occipito-posterior positions	320
A. First variety. Left fronto-acetabular position	322

	PAGE
B. Second variety. Right fronto-acetabular position . . .	323
C. Third variety. Fronto-pubic position . . .	325
§ 2. Presentation of the face . . .	327
A. First position. Right mento-iliac position . . .	330
B. Second position. Left mento-iliac position . . .	331
C. Third position. Mento-sacral position . . .	332
D. Fourth position. Mento-pubic position . . .	332
Art. II. Of unnatural eutocia (presentations of the pelvis) . . .	333
§ 1. Presentation of the feet . . .	337
A. First variety. Loins in front and toward the left . . .	338
B. Second variety. Loins forward and to the right . . .	340
C. Third variety. Loins directly in front . . .	340
§ 2. Presentation of the knees . . .	344
3. Presentation of the breech . . .	345
1. Sacro-anterior positions . . .	346
A. First position . . .	346
B. Second position . . .	346
C. Third position . . .	346
2. Sacro-posterior position. Fourth position . . .	346
Art. III. Of the conduct of the accoucheur during labor . . .	346
§ 1. Of the diagnosis . . .	347
A. Pain . . .	347
B. State of the os uteri . . .	348
C. False pains . . .	348
§ 2. To determine the position . . .	349
A. The vertex . . .	349
B. Face . . .	350
C. The pelvis . . .	351
D. External examination . . .	352
§ 3. Of the prognosis . . .	352
Art. IV. Of the attentions during labor . . .	354
§ 1. Attentions to the woman . . .	354
A. Hygienic treatment . . .	354
B. Of the bed . . .	358
C. Position of the accoucheur . . .	360
D. The touch . . .	361
E. To support the perineum . . .	362
§ 2. Attentions to the child . . .	364
A. Positions of the head . . .	364
1. Occipito-anterior positions . . .	364
2. Occipito-posterior positions . . .	365
3. Face positions . . .	365
B. Presentations of the pelvis . . .	366
1. Presentation of the feet . . .	366
2. Presentation of the knees . . .	366
3. Presentation of the breech . . .	366
4. Oblique positions of the breech . . .	366
Art. V. Of the attentions necessary in irregular or painful labors . . .	367
§ 1. Tardiness of the labor from different causes . . .	367
2. Irregularity of the pains, and of the contractions of the uterus . . .	369
A. Pains in the loins . . .	368
B. Difficult contractions . . .	370
C. Spasmodic contractions of the os uteri . . .	370
§ 3. The bag of waters . . .	371
4. False waters . . .	373
5. Inertia of the uterus . . .	374
6. Ergot . . .	374
7. Abdominal compression . . .	378
SECT. II. —Of dystocia (or difficult labor, preternatural labor, laborious labor, mechanical labor, manual labor, artificial labor, &c.) . . .	378
Art. I. Accidental dystocia . . .	379
§ 1. Of hemorrhage . . .	379

	PAGE
A. Causes	379
1. Predisposing causes	379
2. Efficient causes	380
3. Determining causes	380
4. Placenta prævia	381
5. Vessels of the cord and placenta	382
B. Diagnosis	384
1. Precursory signs	384
2. Signs of flooding	384
3. Internal hemorrhage	384
4. Flooding, with implantation of the placenta over the cervix	385
C. Prognosis	386
D. Terminations	388
E. Treatment	389
1. Refrigerants	389
2. <i>Secale cornutum</i>	390
3. Sinapisms	390
4. Ascending douche	391
5. The tampon	391
6. Compression	393
7. Dilatation of the os uteri, and rupture of the membranes	393
8. Forced delivery	394
9. Placenta prævia	395
§ 2. Of convulsions	396
A. Partial convulsions	396
1. Of the abdominal walls	397
2. Of the viscera	397
3. Of the vagina	397
4. Of the uterus	397
B. Varieties	398
1. Predisposing causes	401
2. Occasional causes	402
C. Symptoms and progress	403
D. General history	404
E. Termination	405
1. Restoration to health	405
2. Progress and death	405
F. Prognosis	406
1. On the mother's side	406
2. On the infant's side	407
G. Pathological anatomy	408
H. Treatment	409
1. Special treatment	409
2. Résumé of treatment	413
§ 3. Prolapsus of the umbilical cord	417
A. Causes	417
B. Prognosis	417
C. Treatment	418
§ 4. Deficiency in the length of the cord	420
A. Natural shortness	420
B. Accidental shortness	420
1. Frequency and varieties	420
2. Prognosis	421
3. Treatment	422
§ 5. Aneurism	423
6. Asthma, hydrothorax, gibbosity, dropsy, &c.	423
7. Hernia	423
8. Syncope and exhaustion	424
9. Different ruptures	424
A. Goitre	424
B. Emphysema	424
C. Fallopian tubes	425

	PAGE
D. Of the hypogastric vessels	425
E. The bladder	425
F. The psoas muscles	425
G. The umbilicus	425
H. The sternum	425
§ 10. Ruptures of the uterus	425
A. Causes	426
B. Its mechanism and seat	427
C. Incomplete ruptures	429
D. Signs of rupture of the uterus	430
E. Prognosis	431
F. Treatment	432
Art. II. Essential dystocia	433
§ 1. Dystocia occasioned by the state of the female organs	433
A. Pelvic tumors	433
B. Urinary calculi	435
C. Anomalies of the vagina	436
D. Of some other affections of the vagina	437
E. Tumors of the vulva	437
F. Inversion of the vagina	438
G. Alterations of the os uteri	438
1. When obliterated	438
2. When contracted or closed by tumors	439
3. Different diseases	439
H. Displacements	440
1. Falling of the womb	440
2. Hernia of the womb	441
I. Deviations	441
1. Of the womb	442
2. Anterior deviations of the head of the child, and posterior deviations of the uterus	442
3. Summary of the deviations	443
J. Abdominal cicatrices	444
§ 2. Dystocia depending on the foetus—monstrosity	444
A. Excessive volume	444
B. Dropsies	445
1. Hydrocephalus	445
2. Spina bifida	446
3. Ascites and hydrothorax	446
C. Different tumors	447
D. Multiple foetuses	447
1. Twin monsters	447
2. Twins	450
E. Mal-presentations	450
1. Deviated presentations of the head	451
2. Deviated breech presentations	451
3. Presentations of the trunk or body	451
F. Spontaneous evolution	455
1. Cephalic evolution	457
2. Pelvic evolution	457
C. Conclusions as to presentations of the trunk	462

CHAPTER III.

OF OBSTETRIC OPERATIONS.

Sect. I.—Of turning	464
Art. I. Of turning in general	465
§ 1. The time for acting	465
2. Position of the woman	465
3. Position of the accoucheur	466
4. To ascertain the position of the foetus	467

	PAGE
5. Choice of the hand	468
Art. II. Version by the head	471
§ 1. History	471
2. Appreciation of cephalic version	473
3. Manipulation in cephalic version	473
Art. III. Version by the feet	474
§ 1. Manipulation in pelvic version	475
A. Introduction of the hand	475
B. Mutation	476
C. Extraction	477
Art. IV. Version by the feet in cephalic presentations	479
§ 1. Left occipito-iliac positions	479
2. Right occipito-iliac positions	484
Art. V. Version by the feet in presentation of the face	484
VI. Version by the feet in deviated presentations of the head	485
VII. Summary of version by the feet in cephalic presentations	485
VIII. Of version by the feet in presentations of the trunk	485
§ 1. Presentation of the shoulder and side	486
A. Positions of the left shoulder	486
1. Left cephalo-iliac position	486
2. Right cephalo-iliac position	487
3. Conclusion	488
B. Positions of the right shoulder	488
§ 2. Presentation of the sternum	488
A. Cephalo-pubic position	488
B. Right cephalo-iliac position	488
C. Left cephalo-iliac position	489
§ 3. Presentation of the back	489
A. Right cephalo-iliac position	489
B. Left cephalo-iliac position	489
Art. IX. Of the manœuvre in presentation of the pelvis	489
§ 1. Presentation of the feet	490
2. Presentation of the breech	491
Art. X. General remarks on version	492
XI. Presentation of the arm	495
§ 1. History and value	495
2. Manipulation	499
A. The arm with the head	499
B. The hands with the feet	499
C. To bring down the other arm	499
Art. XII. General recapitulation on version	500
SECT. II.—Of the forceps and lever	501
Art. I. The forceps in itself considered	501
§ 1. History	501
2. Appreciation	502
3. On the use of the forceps	503
A. Too large a head	503
B. Weakness of the organism	505
C. Accidents	505
§ 4. The parts of the foetus on which the forceps should be applied	506
5. Manipulation	508
A. Occipito-anterior position	508
1. Introduction	509
2. Locking	510
3. Extraction	511
B. Occipito-iliac positions	513
1. Left occipito-iliac position	513
2. Right occipito-iliac position	513
C. Positions of the pelvis	513
D. Double foetuses	514
E. The head, separated from the body, remains alone in the pelvis	515
F. Recapitulation on the employment of the forceps	516

	PAGE
Art. II. Of the lever	517
§ 1. Use of the lever	519
1. Use of the lever as a crotchet	520
2. Use of the lever as forceps	520
SECT. III.—Of the fillet	521
IV.—Of the locked head	522
A. Mechanism	523
B. Signs	523
C. Dangers	524
D. Treatment	524
SECT. V.—Narrowness of the pelvis	525
Art. I. Of regimen as a means of enabling women with contracted pelves to be delivered without the assistance of any surgical operation	528
II. Artificial premature labor	529
§ 1. The induction of abortion	529
2. The artificial induction of premature labor	530
A. Appreciation	530
1. On the part of the mother	530
2. On the part of the child	531
B. Indications	531
C. Methods of operating	533
D. Statistical recapitulation	535
Art. III. Operations performed on the mother	536
§ 1. Death of the fœtus	536
A. Signs	536
1. Rational signs	536
2. Sensible signs	536
B. Of the fœtus alive	539
§ 2. Of symphyseotomy	539
A. History	532
B. Mechanism	540
C. Advantages and disadvantages	541
D. Manner of operating	543
E. Dressing	545
F. Results	545
G. Catolica's operation	546
§ 3. Of the Cæsarian operation	548
A. Abdominal hysterotomy	547
1. History	547
2. Appreciation	547
3. Indications	550
4. After death	550
5. Statistical recapitulation	552
6. Methods of operating	554
7. Manner of proceeding	557
B. Vaginal Cæsarian operation	560
1. Indications	560
2. Method of operating	561
Art. IV. Operations on the child	562
§ 1. Of cephalotomy and embryotomy	562
A. Cephalotomy	563
B. Embryotomy	563
C. Method of operating	564
§ 2. Of crotchets and their use	565
A. Forms	565
B. Method of operating	566
C. When the head has cleared the superior strait	567
§ 3. Cephalotripsy	568
4. Of the extraction of the head when it has been left alone in the genital passages	569

CHAPTER IV.

OF THE NATURAL PHENOMENA WHICH FOLLOW THE DELIVERY OF THE FŒTUS.

	PAGE
SECT. I. —Of the delivery of the after-birth (fourth period of labor) . . .	571
Art. I. Of the simple or natural delivery of the after-birth . . .	571
§ 1. Mechanism . . .	571
2. Attentions required in simple delivery of the placenta . . .	572
A. Exposition of the doctrines . . .	572
B. Appreciation . . .	573
§ 3. Method of operating . . .	575
Art. II. Complicated delivery of the after-birth . . .	577
§ 1. Inertia . . .	577
2. Excessive volume of the placenta . . .	578
3. Contraction of the os uteri . . .	578
4. Encysted placenta . . .	579
A. Mechanism . . .	579
B. Signs and treatment . . .	582
§ 5. Rupture of the cord . . .	582
6. Adhesions . . .	583
A. Causes and signs . . .	583
B. Treatment . . .	584
C. Method of operating . . .	586
§ 7. Absorption of the placenta . . .	589
8. Hemorrhage . . .	590
9. Convulsions and multiple pregnancy . . .	596
A. Convulsions and fits of syncope . . .	596
B. Multiple pregnancy . . .	596
§ 10. In abortion . . .	597
11. Feigned delivery of the placenta . . .	598
Table I. —Division of labor . . .	599
II. —Positions of the fœtus according to different authors . . .	600
III. —Abnormal presentations of the fœtus. Tokological operations . . .	603
IV. —Labors observed by MM. Bland, Merriman, Dewees, Arnell, Moore, Nægèle, Boer, Mesdames Boivin and Lachapelle, and at the Dublin Lying-in Hospital . . .	603
V. —Table showing the mortality of lying-in women in different countries and at different periods; from the registers of the Dublin Lying-in Hospital, MM. De Chateau-Neuf, Dugès, &c. . .	604
Extracts from various reports . . .	605

BOOK VI.

THE SEQUENTS OF LABOR.

PART I.

MANAGEMENT OF THE CHILD.

CHAPTER I.

OF THE CHILD IN A HEALTHY STATE.

SECT. I. —On tying and cutting the cord . . .	608
Art. I. Cutting the cord . . .	609
II. Ligation of the cord . . .	610
SECT. II. —Of cleansing the child . . .	612
III. Of dressing the child . . .	614
IV. Suckling . . .	615

	PAGE
Art. I. Artificial nipples	615
II. Breast pump	615
SECT. V.—Accidents during lactation	616
Art. I. Excoriated nipples	616
II. Engorgement of the breast	616
III. Phlegmonous inflammation	616

CHAPTER II.

OF THE FŒTUS IN A STATE OF DISEASE.

SECT. I.—Of asphyxia	617
Art. I. Causes	617
II. Treatment	618
§ 1. Circulation and heat of the placenta	618
2. Revulsives	618
3. Insufflation	619
4. Tracheotomy	620
5. Electricity and galvanism	620
SECT. II.—Of the apoplectic state	620
Art. I. Causes	620
II. Treatment	621
SECT. III.—Different accidents	622
Art. I. Depression of the bones of the cranium	622
II. The bloody tumor	623
§ 1. Varieties	624
A. First variety	624
B. Second variety	624
C. Third variety	625
§ 2. Recapitulation of bloody tumors	625

PART II.

MANAGEMENT OF THE LYING-IN WOMAN.

CHAPTER I.

ORDINARY ATTENTIONS.

SECT. I.—Immediate attentions	628
Art. I. Applications to the breasts	628
II. Belly-bandage	629
III. Cloth to the vulva	630
IV. Bed for the woman	630
SECT. II.—Subsequent attentions	630
Art. I. Hygienic treatment	631
§ 1. Sleep	631
2. Regimen	632
Art. II. Of getting up and going to church	634
III. Baptism	634
SECT. III.—Different puerperal phenomena	634
Art. I. The lochia	634
II. After-pains	635
III. Milk fever	637

CHAPTER II.

THE SEQUENTS OF DIFFICULT LABOR.

SECT. I.—Displacement of the uterus	638
Art. I. Inversion of the womb	638
II. Simple displacements of the womb	639

	PAGE
SECT. II.—Different lacerations	640
Art. I. Elongation and laceration of the neck of the uterus	640
II. Lacerations of the vagina	640
A. Vesico-vaginal perforations	641
B. Recto-vaginal perforations	642
Art. III. Rupture of the perineum	643
§ 1. Perforation	643
A. Rupture of the central portion of the perineum	643
B. Cases by Coutouly, Evrat, Jobert, &c.	644
C. Causes	645
D. Prognosis	645
E. Treatment	645
§ 2. Laceration of the vulva	645
A. Causes	646
B. Prognosis	646
C. Spontaneous cure	646
D. Suture	646
§ 3. Luxation of the coccyx	647
Art. IV. Oedema of the vulva	648
V. The usual sequelæ of labor	648
§ 1. Affections of the bladder	648
A. Retention of urine	648
B. Incontinence of urine	648
§ 2. Affections of the rectum	648
A. Constipation	648
B. Hemorrhoids	648
§ 3. Affections of the genital organs	648
Art. VI. Thrombus of the vulva	649
§ 1. Nature and frequency	649
2. Progress and termination	650
3. Treatment	651

AUTHOR'S PREFACE.

CONFOUNDED with the other branches of medicine, and pursued almost exclusively by mere medicasters during the long series of ages, the Art of Midwifery has advanced with extreme slowness. Among the Egyptians, the Hebrews, the Greeks, and the Romans, it was reduced in some sort to what concerns the cutting of the umbilical cord; and even at the present time, in countries that are imperfectly civilized, those who make a profession of it inspire so little confidence, that the husband is still compelled to imitate the conduct of the first man, that is to say, he becomes the accoucheur of his wife. These primitive notions have doubtless long ceased to exist amongst us; in our day, the Art of Midwifery is especially seen to acquire a rapid movement, and to progress equally with the other departments of the art of curing. It would, however, be wrong to conclude from hence that everything has been already done, and that no further improvements can be made. The science of Obstetrics ought to follow the movements of the age, and advance if it would not retreat. It seems to me that it may be defined, *the ensemble of knowledge relative to the reproduction of the human species*. By studying it under this extensive and philosophic view, and by doing away the absurd and vulgar prejudice that it is impossible to be at the same time a skillful accoucheur and an able physician, we shall succeed in establishing it upon a basis worthy of the subject!

In this book I have endeavored not to be unjust to any one. I have spoken on all occasions without being influenced by hatred or prejudice, and I may add, without enthusiasm, and with absolute independence. The sciences compose a republic in which every man is at liberty to make researches, to examine and think for himself, as well as to say what he thinks. Truth is the avowed object of all who cultivate them: it may be reached by a hundred different routes, and I could never understand how any reasonable man can be offended because his ideas fail to be received as laws for other men.

In adopting a course somewhat different from that pursued by the modern classic writers, I was not misled as to its merits. No person attaches less importance to classifications than I do, or is more fully convinced that every one has an equal right to choose for himself. The course I have chosen appeared to me to be more natural than any other; I found that one was necessary for my purposes, and I preferred this one; I shall, therefore, make no further attempt to justify it. It belongs to the public to decide whether it be good or bad.

I have given a name to the science of the accoucheur: in the first place, because it is a substitute for a periphrasis; and in the next, because it is quite extraordinary that that science should have remained until the present day without any special qualification in France. From the earliest years of my studies, I employed, as Mr. Blundell has done in London, the term (*obstetricie*) obstetrics, derived from the Latin *obstetrix*, midwife, and which still continues current in Italy. I think it more uniform in acceptation than the word *obstétrique*, which is used in Germany,

and which M. Dugès has desired to establish among us. But the word *tokology*, derived from *τοκος*, child-birth, and from *λογος*, word, out of which may be constructed the terms *tokological*, *tokologist*, *tokologue*, *tokograph*, &c., and which present nothing hard or difficult in their pronunciation, has seemed to me more conformable to the habits of our language and the rules of grammar, as it has also to Mr. Ryan, who congratulates himself on having adopted it. I advise those in France who have blamed me for employing in this manner new terms, for example that of *eutocia* (natural labor), and who will doubtless blame me still more, for calling the remedies which facilitate labor *oxytocics*, to read the thesis of M. Haber upon what they consider neologism.

It is of the nature of a preface to set forth the motives of the author of a doctrinal book, and the advantages which he supposes himself to enjoy over his predecessors. I hope that I may be permitted to dispense with this common form. At the present time everything progresses so rapidly, that each moment, so to speak, is marked by new wants, and elementary works require to be often revised and improved.

In composing my book, I have attempted to make a profitable use, not only of the works of my own countrymen, whether ancients or cotemporaries, but also of all such foreign writers as I could have access to. Numerous materials have also been furnished by between one thousand and twelve hundred labors, examined with care either at the *Maternité* at Tours, and the hospital *Saint Louis*, while I was a student there, or at the hospital *de perfectionnement*, while I was in service there as Chef de Clinique, or at my public amphitheatre. My private practice, since I began to teach tokology, has also furnished me with valuable materials, from which I have sought to derive advantage.

The first edition of this book was only the recapitulation of my lectures. I had particularly designed it for the use of students. I have in this endeavored to present, as nearly as possible, the actual state of the science, under the double aspect of theory and practice—my aim being to render it useful, not only to students, but also to practitioners, and even to those who are engaged in teaching this science.

The article concerning the pelvis is here entirely new in relation to its axis, its straits especially, and its vicious conformations. It is the same with that on the genital organs, regard being had to their varieties, to the practical inductions which flow from them, and to the operations which they require.

I have completed the article on menstruation, and that on reproduction, by numerous additions; and what relates to the softening (*ramollissement*) of the symphysis during pregnancy, has been entirely re-written.

I have added a great deal to the article on *touching*, and have endeavored to show the advantages of *touching* by the rectum, as well as of abdominal exploration, in a vast number of cases.

A long chapter upon auscultation seemed to me indispensable, and I have given it.

Extra-uterine pregnancies, their mechanism, their signs, their terminations, and especially their treatment, form the subject of an article almost entirely new.

False pregnancies, as well as double pregnancies, and superfœtation in general, are treated in the same manner. I have also renewed the article on abortion, especially in regard to the diseases of the ovum, of moles, and of the treatment required.

After these, the principal changes in this edition are:—

1st. Upon the mechanism of labor in general.

2d. Upon the mechanism of labor by the head—by the vertex first—then by the face, and finally by the pelvis: all subjects which have been discussed for fifteen or twenty years in foreign countries, and of which I intend to give a review, together with their explanation.

3d. Upon the assistance which the woman may require in natural labor, and particularly upon the use of ergot.

4th. Upon the hemorrhages (*peries*) which occur during pregnancy, or in labor; especially upon the treatment of these affections, which I had not sufficiently dwelt upon, and of which the field has latterly been very much enlarged.

5th. Upon the shortness, too great length, twisting of the cord, and the accidents which may result from them.

6th. Upon the different ruptures sometimes observed in the course of labor.

7th. Upon tumors of the pelvis, and calculi of the bladder.

8th. Upon the coarctations of the vulva, vagina, and mouth of the uterus.

9th. Upon prolapsus of the uterus in its gravid state, deviations of its orifice, and its obliquities, properly so called.

10th. Upon the diseases, tumors, and deformities of the child, which may become causes of difficult labor.

11th. Upon the theory of spontaneous evolution, which I had scarcely mentioned, and which I have now treated at length, insisting upon the new explanation which this strange phenomenon admits of.

12th. Upon version, either by the head, or feet, and upon the relative value of these two operations, regarded in a new light.

13th. Upon presentations of the arm, and the management which they require.

14th. Upon diet, and the production of abortion and premature labor in cases of narrowness of the pelvis; questions scarcely mentioned in the first edition, and of which I thought it necessary to treat more fully in this.

15th. Upon the Cæsarian operation, either abdominal or vaginal, and upon symphysiotomy.

16th. Upon the operation for breaking up the head of the child, on which I had only said a word, and to which I have now endeavored to give its true value.

17th. Upon the cautions required in the delivery of the afterbirth.

18th. Upon the hourglass contraction on the placenta, and its retention in the uterus.

19th. Upon the possible absorption of the afterbirth; an article entirely new.

20th. Upon hemorrhage after accouchement, and the use of injections of the umbilical cord, compression over the hypogastric region, compression of the aorta, and transfusion as means of delivering women from the dangerous consequences of this accident.

21st. Upon the attentions to be given to the child, and upon the sanguine tumors on its head, which are sometimes produced in the birth; upon the flattening of the head, the falling off of the funis, and hemorrhage at the umbilicus; upon lactation, both natural and artificial; upon the dressing of the cord, and the operation of the fillet; and upon some slight indispositions of the newly-born infant.

22d. Upon the inversion of the uterus after delivery, and the principal changes which its neck undergoes after accouchement.

23d. Upon sanguine tumors of the vulva, hemorrhoids, retention of urine, inflammation of the genital organs, and the other consequences of childbirth.

24th. Upon ruptures of the uterus and vagina; upon recto-vaginal, vesico-vaginal, and urethro-vaginal fistulas.

25th. Upon perforations of the perineum, the consequences and frequency of them.

26th. Upon the lacerations of the perineum, and their treatment.

27th. Upon the engorgement of the breast, and fissures of the nipple, and also upon some of the qualities necessary for a good wet-nurse.

The seven last articles were not treated of in the edition of 1829.

Moreover, it may readily be conceived that I have thought proper to modify,

more or less, all the other articles in my book, and that I have only particularized cursorily in this place those which have been rewritten or superadded.

Thus, the work now forms two large volumes, instead of two small ones which might have been bound in one when it first appeared.

I have also suppressed some portions. The work which I have published upon the human ovum has enabled me to curtail considerably the article on embryology, at the same time rendering it more perfect.

Upon the whole, however, I have only suppressed a small portion of the old text; and an historical notice of considerable length forms, moreover, the introduction to the first volume of this edition.

Plates have been added to the whole. I have borrowed some of them from different authors; but the greater part have been taken from nature with the greatest care. Having given them for the purpose of rendering more clear some points in the science of tokology, I have thought it necessary to go a little beyond what had been accomplished in this way. The axis, the planes, the straits of the pelvis, whether in the recent or the dry state, required some new points of illustration. The ovum had nowhere been well represented. It was the same with some positions upon which I have endeavored to engage the attention. Moreover, they have been confided to skillful artists, and have been faithfully executed after the drawings of Chazal. If I have scarcely said anything of the work of Coste upon the ova of the mammiferous animals, it is because, up to this time, this observer has engaged himself upon matter beyond the limits of the subject of my present researches. On the other hand, the remarkable memoir, for which science is indebted to Bischoff, has been received too late for me to avail myself of it. Moreover, it is not in a treatise upon obstetrics that I could be able to discuss in suitable detail so many questions relative to ovology; but for this, I would also have extended, more at length, my observations upon the work of Dr. Granville, less, perhaps, because of its real importance, than on account of the impression which it appears to have produced in England. I hope, moreover, to find an occasion of returning to it hereafter.

INTRODUCTION.

ARTICLE I.

IMPORTANCE OF THE SCIENCE OF OBSTETRICS.

THE science of obstetrics is one of the most important and positive branches of medicine. Comprehending all that concerns the reproduction of man, it necessarily embraces a vast domain, and almost always occupies itself with two beings at the same time in its means of application. Its most essential principles, being drawn from the laws of mechanics, or based upon the most exact anatomical facts, have far outstripped those speculative systems with which the healing art, properly so called, has often been the sad plaything, and gives to the resources it employs a degree of precision which causes it to approach in certainty the mathematical sciences. Requiring a profound study as a speciality; an experience which can scarcely be met with except in those who have made it the subject of deep meditation, besides having its boundaries well defined, it may be separated from the great medical tree without danger, as a particular branch, or as a distinct practice.

It must not be thought, however, that every one agrees in the estimation which I assign to it. A large portion of the public, a great number of philosophers and physicians, place the obstetrical art very low in the scientific scale. Some writers have even gone so far as to question its utility. Others regard it, at least, as so easy and simple, that they have proposed to trust it exclusively to women. As these different views are supported by facts and reasons, it cannot be without some interest to examine them here.

Tokology is a useless science, according to some, because in one hundred cases of labor there is only one, at the most, which requires assistance. A. Leroy repeated openly that one could explain it on the back of a playing card. But without pretending with Dionis that the accoucheur is actually indispensable in eight cases out of ten, or even in one case out of seventeen, of thirty, forty, or sixty, as we find it stated in our modern works, we may, at least, answer that the intervention of art becomes useful during labor much oftener than it appears from the opinion of Courtin. Besides, the infrequency of their application should not be a reason to deny the utility of tokological resources. The assertion of A. Leroy, reducing itself to a mere boast, does not form a valid objection. It finds its source probably in the impossibility, with this author, to allow any work to possess merit, after his having announced or commenced such a great number. Roussel invokes, and many others have invoked, like him, that which takes place in countries where civilization has not yet penetrated. In them, doubtless, according to Roussel, there are neither accoucheurs nor even *sages-femmes*. If we believe Th. Bartholin, the aborigines of America make no preparation for lying-in. Crantz says the same of the Greenlanders. According to Bruce, the

women of Wales do not even lie-in for their delivery. It is the same with the Abyssinians, according to the report of Pitavel, and with the African tribes visited by Winterbottom. Among the Ostiacks, the women do not intermit their work or journeys for childbirth, if the Abbé Prevost is not deceived. Long appears to have witnessed the same custom in the Indies. While Chardin states that, in Persia and in China, the art of obstetrics does not even exist. But what do such stories prove? How are we to know, in reality, what savages or nations, who conceal from us with so much care their most common customs, do in such circumstances? To what errors are not travellers exposed in their intercourse with men so distrustful, and so much disposed to deceive? Moreover, if there are no titled accoucheurs in such uncivilized countries, there are no physicians. What, if not a *sage-femme*, is the old woman of the family, who, on the authority of even Chardin himself, is called, in Persia, at the moment of labor, to receive the child and nurse the mother? Moreover, to draw from this some practical deduction, it is necessary to show that, all things being equal, parturition causes fewer accidents in these countries than amongst us. But no one has yet done this.

Diodorus, of Sicily, says that in Corsica the husband lies in bed, while the newly-made mother attends to the duties of the household. Strabo believes that a similar custom existed in Spain. The same is said of the Brasilians. Maltus gives to the people of Siberia a practice which is little less singular, and probably quite as true; it is that, during the pains, the abdomen of the woman is tightly bound, and, at the same time, by a signal agreed upon, a number of men placed around the house discharge a volley of firearms! May they never propose that we should adopt such prudent customs!

For what good, then, must we refer to savages, and invoke credulous or incompetent historians, to prove that a woman may be delivered without assistance? Who does not know that many peasants do this in our country? that even in Paris, girls fortunate in concealing their pregnancy to the last moment, find sometimes the means of escaping for half a day to deliver themselves, and resume immediately afterwards their accustomed habits of life? It is not necessary to go to the shores of the Nile, nor to the Indies, to know that among the poorer classes, many women toil until labor actually commences, and resume their work almost immediately afterwards. This is observed everywhere; but what shall we conclude from it? That such conduct, the frequent source of grave maladies, is not always followed by dangerous accidents, and that society should seek steadily the means of reducing more and more this necessity, instead of transforming it into the rule, and holding it up as a model to be approved of.

To end such discussions, it is necessary to remember that the services rendered to women during labor are of different kinds. Some are simply useful, others are necessary, and some are indispensable; and some also are useless, hurtful, and even dangerous. If, in order to reject them altogether, we only think of the evil the second class may produce, we will have, without doubt, the appearances of reason and right on our side; but who would dare doubt the benefit which may result from the first class? Now, it is to determine exactly the choice between them which calls for the science of the accoucheur.

Not contented with arguments furnished by so many tribes in a state of nature, some persons have undertaken to draw an analogy from the other mammalia. Observing that the delivery of animals exposes them to fewer dangers than parturition in the human species, Roussel has drawn from it the deduction that the aid given to woman by a fallacious science is the cause of this difference, and that, in a function so natural, it is only necessary to trust to the operation of the organism itself. Far from strengthening such opinions, the delivery of animals and its consequences positively support the contrary. In the structure of their organs and their habits, we may discover why the expulsion of the young, and

the *ensemble* of reproduction, produce so little inconvenience in animals. It is thus we may be able, as Osborne wishes, to refer to the vertical position one class of dangers and difficulties of labor in women. The pelvis is narrower in proportion to the volume of the fœtus, and is more solid in the human species, in whom, besides, it expands between the two straits, and is strongly curved. It is straight or nearly so, and is much lengthened in the other mammiferous animals, in which the young present themselves generally by the mouth, and not by the vertex.

But animals are far from being free from all accident when they bring forth their young. To convince ourselves of this, it is sufficient to observe with care the parturition of cats, dogs, goats, swine, sheep, and mares. The operation of turning, the crotchets, the Cæsarian operation through the vagina, are sometimes necessary in cows, and they are also subject to retention of the placenta, and to inversion of the uterus, &c. Country people are so well aware of it, that they always expect to lose some of them during the season of calving, and provide many precautions against these accidents. The robust constitutions of savages, and of women accustomed to hard work in the country, cause them to be exposed to a smaller number of accidents, without doubt, than those in populous cities, and than delicate women enfeebled by the excessive refinements of civilization; but when these accidents happen, they are in reality but little less intractable in one class than in the other.

Observe if peritonitis, ruptures of the uterus, the Cæsarian operation, version, mal-presentations of the child, &c., are not destructive of life in all conditions; and still more frequently in the barbarous than in the civilized state. It is with savages as with the brutes; as it was in ancient times with the Greeks, as it is now with the peasants in some countries. They are seldom ill on account of their fortunate constitutions; and they are robustly constituted, because the diet, or the habits of their earliest years, do not allow those who are delicate when born to continue to live; and it could only be by a strange aberration of intellect that we should seek among them weapons against the importance of the obstetrical art.

ARTICLE II.

OF THOSE WHO OUGHT TO PRACTICE OBSTETRICS.

The question whether the assistance which parturition requires should be confined to one sex rather than to the other, does not appear to me to be difficult of solution. There is no doubt that when the function itself is simple, the *sage-femme* is able to direct it equally as well as the physician, and that the knowledge of which she is susceptible, and the operations she is capable of performing, suffice at least nineteen times in twenty cases; but the nervousness, the gentleness, the timidity, which are natural to women, their tastes, the studies and occupations in which they employ themselves, the prejudices and even the public security, forbid them, except in a few instances, to go further and undertake the direction of complicated labor.

Hecquet, who has so loudly declaimed against the indecency of having men to deliver women, and whom Dionis has attempted to refute, does not reflect that during labor modesty is soon superseded by fear, by the sentiment of preservation; and that no one hesitates to send for a surgeon when there is disease of the female organs of generation, or when an operation is to be practiced upon them. Everything being equal, the obstetrician offers more security than the *sage-femme*. He can redress accidents if they arise, whilst she only is useful in the most simple cases. In order that each may play their parts, it is necessary that the *sage-femme* should agree to fill the office of nurse, and that the accoucheur should

confine himself to the superintendence of the last stages, as well as of the consequences of labor. In this manner, the former would play a very important part; for the greater number of cases require no other assistance than hers, and the latter could not complain, since he would only be employed in the capacity of physician or surgeon; but it is not probable that it will often be thus. The family themselves determine to employ the one, or the other, and rarely send for both at the same time. As the accoucheur can supply the place of the *sage-femme*, and as the reverse is not the case, it is to be feared that the circle of Lucina will become gradually smaller. We may even assert that *sages-femmes* would soon cease to be employed, if the presence of the physician did not greatly enhance the expenses of the case.

It appears to me that the arguments drawn from history in favor of *sages-femmes* possess no value. If the Greeks imagined a goddess, a Lucina, to preside over parturition, the Romans invoked in similar cases gods of the other sex. Because *sages-femmes* are only mentioned as assisting at the accouchement of Rachel, Tamar, and Ruth, in Genesis, it does not follow, says Dionis, that men were never consulted on the same subject. When the accouchement of Maria Theresa, or of the Queen of France, wife of Louis XIV., is spoken of, *sages-femmes* are only mentioned, although Boucher was always in the antechamber during the labor. To those who, with this priest, nephew of the dames de la Marche, contend that in the beginning man never approached a woman in labor, we may reply, that the first woman on the contrary must have been assisted by a man, and that Eve could have had no other assistance than that of Adam.

Supposing that the story of Agnodice, of Athens, was anything more than a mere fable, it proves nothing, unless it be that then, as now, *sages-femmes* were not in great repute. If, in braving the Areopagus which had forbidden women to practice medicine, this young woman disguised herself in male attire, and succeeded in having this obnoxious decree revoked, men were not, however, excluded from the exercise of the practice of obstetrics. Moreover, the writings of Hippocrates, Galen, Celsus, Aëtius, Paul of Egineta, Albucasis, Moschion, Rhodion, Paré, Guillemeau, Viardel, Mauriceau, &c., demonstrate that physicians have at all times been called to attend women in labor.

De la Touche more positively proves it, since we see him, about the middle of the sixteenth century, declaiming against what he calls "*the cursed and perverse ignorance of sages-femmes.*"

I will add that, in judging from the past, the future promises nothing favorable to the prosperity of *sages-femmes*, as the disciples of Baudelocque have multiplied in France in a far greater ratio than in any other country in Europe. In the infancy of society, in the rude epochs of civilization, and in semi-barbarous countries, females were almost wholly delegated to assist women in their accouchements. Later, and as civilization advanced, physicians were called upon to render their services: afterwards accoucheurs, properly so called, were required. Still later, these accoucheurs were required to be surgeons, and at length it was asked, to whom should this science be entrusted, the physician or the surgeon? inasmuch that Saint-Germain, about the middle of the seventeenth century, and A. Petit, were obliged to defend themselves against the attacks of the surgeons, because, although physicians, they had written upon obstetrics.

Now since these tiresome discussions are terminated, and since whoever has the title of doctor has the right to practice midwifery if he pleases, we see that where elegance abounds, or manners are untrammelled, or social ties bind, women prefer more and more that physicians should attend them in child-bed. We may follow this curious change in glancing our eyes upon what passes in the United States, England, Germany, France, Italy, Spain, and Portugal. We may then conclude that the natural progress of society tends to place *sages-femmes* and

accoucheurs in the respective positions above indicated, or rather to dismiss the *sages-femmes* from the scientific profession, and to reduce them to the grade of prudent and skillful nurses.

ARTICLE III.

HISTORICAL NOTICE.

IN order to obtain a clear and precise idea of the origin and progress of the obstetrical art, it is necessary in my opinion not to confound, as so many have hitherto done, the complications which may occur during parturition with the function properly so called. A simple labor, in fact, is an organic act, laborious and painful; but it is not a disease. When it becomes complicated, on the contrary, it should be regarded as a pathological condition, and, often, even as a very dangerous affection. As a function it only requires the assistance of a friend, a neighbor, or a *sage-femme*; as a disease, it requires more; a physician, or rather a skillful surgeon, becomes necessary. Under this point of view, we may say that the art of the *sage-femme* is anterior to that of the accoucheur; for it is not reasonable to admit that complicated preceded simple labor; and if accoucheurs have appeared at the same epoch with physicians, the appearance of *sages-femmes* evidently dates from the beginning of the world.

§ 1. SAGES-FEMMES.

So long as the healing art was reduced to empirical formulas and to vulgar traditions, females alone were entrusted with the care of women during parturition. And, inasmuch as this business is exercised by women *the most often*, says Guy de Chauliac, it is unnecessary to pay much attention to it.

It was later before men could adopt this practice; not until they had acquired anatomical instruction, and a certain degree of physiological and medical knowledge. So that nearly always, whenever mention is made in ancient history of anything which relates to accouchements, *sages-femmes* only are spoken of. Rachel, who died in child-bed, was attended by a *sage-femme*. It was also a *sage-femme* who was with Tamar when she brought forth twins. Saint Jerome says that the Holy Virgin had no *sage-femme* to assist her in her labor. Hippocrates speaks of *sages-femmes* under the title of *αἰσθητῆς*; and we see in Plato, or rather in Diogenes Laërtius, that Phenarete, the mother of Socrates, was a *sage-femme*. Aristotle wished that the *sages-femmes* might be skillful in cutting the cord. Pliny also mentions several. Terence does the same, and sometimes introduced them in his comedies; so that with the Hebrews and Greeks, as among the Romans, and in all parts of the world, *sages-femmes* were always called upon to assist women in labor. The names of a great number of them have even been transmitted to us in history.

Shiphrah and Puah, who withstood Pharaoh, as mentioned in Exodus, when that prince commanded them to cut the cord in such a manner as to destroy all of the Hebrew children, are the first we find on record. Fabulous history also places Lucina, Minerva, Omphale, and Olympia among *sages-femmes*; and without noticing Lasthenie de Mantinée, Berecunde, Léoparde, Mena, Maïa, Maria, Margaritha, and many others whom some writers mention, we find several who have acquired a certain celebrity.

Aspasia, of whom Aëtius has left us some account, enjoyed, according to him, a great reputation among the Greeks; and she was also skillful in producing abortion, and in causing barrenness. Sullied by this exercise of her science, the memory of Aspasia would have suffered less, perhaps, if it had been remembered

that Hippocrates himself speaks of the induction of abortion as of a legitimate action.

Galen mentions a certain Eléphantide, who was also skillful in preparing cosmetics; and we find in Moschion, or in J. Bauhin, some chapters which are thought to refer to Cleopatra, a *sage-femme* of renown, who, however, cannot be the celebrated queen of the same name, although some authors maintain that it was.

There were also *sages-femmes* in Rome; but we must acknowledge that posterity has only rescued their names from oblivion in order to disgrace them. Every one knows the part which Lesbia and Laïs are made to play in Terence and Pliny. Sotira and Salpe, who are cited by Pliny, and those who are introduced in Plautus, bear, however, a more honorable character. Trotula, who appears to have been of the school of Salerno, and who is thought by many historians to have belonged to the thirteenth century, is supposed to have been a *sage-femme*. We also find, in the writings attributed to Th. Priscien, that then (eighth century) a *sage-femme* lived, named Sylvia or Victoria, as this author dedicated his book "*ad Sylvianam, or ad Victoriam.*" Even at this early epoch, the *sages-femmes* did not limit themselves to directing, and rendering less protracted, simple labor; they even went so far as to make rules, which some of them published. We may also subjoin, with Astruc, that the little book by Trotula is the first special treatise on obstetrics that is known. It is only of a comparatively recent date that *sages-femmes* have really taken the rank of authors in science.

Louise Bourgeois, who lived in the time of Paré, is one of the first who completely understood the necessity of promptly evacuating the uterus when a violent hemorrhage supervenes during labor. The dames de la Marche, who practiced at Hôtel-Dieu at the same time with Mauriceau, have also left a small collection which may be advantageously consulted.

Madame Lemache particularly distinguished herself towards the close of the last century, and one of her descendants, Madame Choisy, was still practicing in Paris a few years ago.

Manikins, or phantoms, for the study of obstetrics, were invented by Madame Leboursier-Ducoudray, who carried them about from province to province in order to demonstrate the importance of them. To Madame de Lunel we are indebted for the best observations on the retention of the placenta. Madelaine Aubert, the niece of Duverney, is favorably known to us by her description of a double-headed fœtus.

Mademoiselle Bihéron, gifted with a great talent for anatomy, taught the art of obstetrics successively in Paris and in London, where Hunter was her pupil. She executed several wax models, and perfected the tokological manikin. She died in 1785.

Madame Contenceau acquired a great reputation at Bordeaux, where she superintended the Maternity Hospital in an able manner. The little work which she published for the use of female pupils, however, contains nothing original.

A pupil of Sacombe, Madame Liquière, published in 1797 a Memoir on the Mechanism of Labor, which also fails to teach us anything new.

France reveres still the memory of the dames Boucher, Bidard, Lalande, &c., whom, however, Madame Lachapelle and Madame Boivin have greatly excelled.

Other countries have also had their celebrated *sages-femmes*. In England, we find Madam Nihel, who proscribes all instruments, and who maintains, against Levret, that the placenta never is inserted over the neck of the uterus. Her work, which was translated into French, induced Leroy to believe that Nihel was a fictitious signature adopted by an accoucheur of Paris. Madame Blackwell lived in 1712; the five hundred plates which compose her "*Curious Herbal*" extended her fame throughout Europe. Sarah Stone, who speaks of delivery in

face presentation, and of the accidents caused by the ignorance of certain matrons in endeavoring to remedy it; and Maria Dunnally, who first practiced the Cæsarian operation in this kingdom, also deserve favorable mention.

In the north of Europe, we must not forget Madame Horenburgin; nor Madame Justine, of Brandenburg, who gives the strange advice of bringing down the feet on the dorsal plane of the fœtus, in practicing the operation of version; nor the Mesdames de Siebold; nor Madame Wytttenbach, the friend of Madame Boivin.

Madame Horenburgin, who flourished in Germany towards the end of the seventeenth century, published a book, which was translated into French by Mademoiselle Murher, but was never published, and which contains nothing that had not been advanced before by others. Madame de Siebold, and her daughter Mademoiselle Charl. de Siebold, *sages-femmes* of Darmstadt, accomplished for Germany, says M. Delacoux, what Madame Lachapelle has done for France; but this is an exaggeration in favor of the German authors, for even to the present time they have produced nothing very remarkable. Italy also possesses some remarkable *sages-femmes*. Anne Morandi, of Bologna, distinguished for her models in wax, and by her lectures on anatomy, holds a conspicuous station among the midwives of that country. She died in 1774. The same may be said of Fulvia Morata, who died, aged twenty-nine, when she was about establishing a school of obstetrics at Heidelberg. Angelina is less known. M. Balardini mentions another; but none of these can be compared to those of whom France is proud.

§ 2. ACCOUCHEURS.

A. ANTIQUITY.

If antiquity presents us no renowned accoucheurs, it does not prove that the physicians were ignorant of the obstetrical art.

I. *Hippocrates* was aware that the child could only present itself in the straits by the head, the pelvis (lower extremities), or the trunk; that it could not pass out, without descending by one extremity of its great diameter; and that it was necessary to turn it, when it presented transversely. Not possessing the forceps, he pulled on the head either by introducing the fingers into the mouth, or by seizing the chin of the child, particularly if it were dead, and after the medicines and other assistance given to the woman had failed. Aware of the danger of delivery by the feet, he preferred to bring down the head; but he was not ignorant that this manner of delivery was practicable, and ought even to be performed in certain cases. He also mentions the procidence of the arm, the replacing and the amputation of this member, embryotomy, the afterbirth, and the bandaging of the abdomen; so that, if well understood, the doctrines of Hippocrates more nearly approach to those which have been in vogue since his time, than is generally supposed.

II. *Galen*, who occupied himself less than Hippocrates with the practice of obstetrics, insists, however, upon some theoretical points. He first taught that the muscles of the abdomen assist in expelling the fœtus, which latter, according to him, does not make the summerset until labor approaches.

III. *Celsus*. Although with extreme conciseness, Celsus treats of the mechanism of labor with great clearness. If the uterus is too strongly contracted, it is necessary to wait until it relaxes, or use means to relax the spasm before introducing the hand. A living child may be delivered by the feet. If it be dead, it may be delivered either by the head or feet. If it descends transversely, it may be decapitated, and afterwards extracted with the crotchet. In delivery by the feet, it is necessary to place the cord in such a position that it may not be

compressed or ruptured. The head only remaining in the uterus ought to be pressed down with one hand over the hypogastric region, while endeavoring to extract it with the other. Celsus also removed the coagula remaining in the uterus after the delivery of the placenta.

IV. *Aëtius*. The doctrines of Celsus, which are really nothing more than a *résumé* of the science of his time, are met with very much enlarged, under different heads, in the compilation of Aëtius, who devotes his 22d, 23d, and 24th chapters to the diseases of women, and to obstetrics. Chapter 22d, which expounds the doctrine of Aspasia, shows that the obliquities of the uterus, and the vicious positions of the head, were not unknown to this author. Philumène, who speaks in the 23d chapter, is the first who mentions the impaction of the shoulders after the escape of the head. He also prefers to leave (chapter 24th) the too firmly adherent portions of the placenta in the uterus, rather than to tear them away with the hand.

V. *Paul of Egineta* appears under the most favorable auspices. Surnamed *Alkababel* (woman's doctor), he gave public lectures on obstetrics, which attracted female students from all countries. According to him, parturition is natural or laborious. The premature rupture of the bag of waters is one of the frequent causes of the latter. He speaks of an arm-chair, and forbids the succussions recommended by Hippocrates. If the hand presents, he elevates the shoulder by placing the thumb under the axilla. When both feet show themselves at the vulva, he advocates delivery by them, and recommends that traction should be made obliquely, or by gently twisting the limbs. He thinks the crotchet ought to be applied to the occiput, and that perforation of the head is sometimes necessary, to enable the practitioner afterwards to seize it with the pincers. As to the afterbirth, Paul of Egineta preferred to wait for it, rather than to use force when the uterus appeared to be irritated.

B. MIDDLE AGES.

I. *Greeks*. I do not speak here, except as a memorial, of Priscien and Eros, liberated by Julia, the daughter of Augustus, who, according to Gesner, is synonymous with Trotula, inasmuch as they have added nothing to the tokological science, and as nothing is precisely known of their existence. The age in which Moschion lived is only little better known, it is true; but the writings which are attributed to him, and the editions of his works which Gesner has mentioned, place him very high in the hierarchy of accoucheurs. He maintained that a living child might be born, notwithstanding the most protracted labor; that it is advisable to vary the position of the woman in order to change that of the fœtus; that delivery by the feet is almost as easy as by the vertex; that if the arm presents, we may search for the feet, but that it is better to bring down the head, especially in the transverse positions, and that the occiput ought to come down; that the uterus is subject to many kinds of obliquities; and that it is proper to tie the cord in two places, and to cut it between the ligature.

II. *Arabians*. If we pass from Moschion to the Arabs, it is easy to understand that many of the difficulties of parturition had already been recognized, and that quite a number of instruments had been invented for remedying them. Avicenna, for example, speaks of pincers, which may have suggested the idea of the forceps. This author goes so far as even to advise breaking up the head with some kind of nippers, when it is too large to pass the canal of the pelvis; so that he had seized the indications so happily amplified upon afterwards by M. A. Baudelocque. Avicenna devotes, moreover, the first eighteen chapters in one of his works to pregnancy and to generation, and the first twenty-nine chapters of another to the different kinds of labor. Albucasia, so bold for his age, says nothing, however, which is not found in the Greek authors, and chiefly in Aëtius, who appears to be

his favorite authority; whilst Avicenna appears rather to have drawn from Paul of Egineta. His surgical knowledge explains clearly his predilection for the use of instruments, in many passages of his writings, where we may see the figures of four kinds of pincers, an elevator (made after the manner of a crutch), and two cutting spatulas, &c. The case cited by him of a foetus which came away in shreds through the abdominal walls, refers probably to the first example known of rupture of the uterus. Rhazes, who practiced before Avicenna and Albucasis, Serapion, and other writers of the same nation, give no data worthy of attention which were not known before they wrote.

III. *Frenchmen*. Guy de Chauliac, a great admirer of the Arabians, advises the *sages-femmes*, if the child be dead, to endeavor to deliver it with their hands, or to extract it entire with the crotchet, or piecemeal with the nippers.

If, after using provocatives, the afterbirth does not come away, he also recommends the *sage-femme* to introduce her hand, previously lubricated with mucilage, into the uterus, and to withdraw it gently.

At this epoch, then, we find the obstetrical art reduced to principles vague and indefinite. No one had yet formed a positive doctrinal code for it. Paul of Egineta, and Moschion alone, appear to have practiced it. Every physician treated of it, but only in one or two chapters in the body of his work, and none seemed to think of making it a separate branch of surgery. We must remember, however, that medicine was a unity then, and that the same person was accustomed to practice all of its branches together.

C. SIXTEENTH CENTURY.

I. *Eucharius Rhodion*, or *Rœsslin*, marks the commencement of another epoch. His book dates from 1519, according to Osiander. M. Busch places it as far back as 1502. The Latin edition which I have seen is dated 1532, and Bienassis gave a French translation of it in 1536. This little book acquired great celebrity. It contains little, however, besides what had been said by Hippocrates, Aëtius, Paul of Egineta, Moschion, and Avicenna, whom it sometimes mentions; but never have so many precepts been collected in such a small volume, or been presented in so luminous a manner, so as to be readily understood, in a distinct treatise. Rhodion gives the figure of a chair to be used by women in labor; also plates of several positions of the foetus, and one of a double-headed monster, which resembles the famous *Ritta Christina*. These figures, and his habitual language, do not prevent us from supposing that he himself had only seen a very small number of accouchements. Indeed, he narrates and prescribes, and he does not speak of his personal experience; again, we are much surprised in seeing him determine, after Albert, that the occipito-sacral position is the ordinary position of the head in vertex presentations. Upon this point we might easily accuse the translator, if a glance at the figure did not force us to refer this singular mistake to the author himself.

II. *J. Rueff*, who comes immediately after Rhodion, has drawn from the same sources with him, if he has not copied from him. The plates of the one and the other are too much alike for each to have imagined them separately. Rueff, besides, reproduces the pincers of Avicenna and Albucasis, after having improved them under the appellation of *forceps longa et tersa*, and of *Rostrum anatis*. Perhaps he is the first writer who mentions the thrombus of the vulva, and its treatment. The appearance of these two works was the signal for a real revolution in the art of obstetrics, which was then separated from the great medical tree as a speciality. They were given as manuals for the use of *sages-femmes*, who were thus enabled to divest themselves of their ancient routine practice; and surgeons disdained no longer to assist women in the most simple labor.

III. Both *Franco* and *Paré*, who were not long in appearing before the public, endeavored to prove that presentations of the feet were not dangerous, and that in vicious presentations it was better to deliver the child by the feet than to endeavor to bring down the head. The manipulation which results from this doctrine is very clearly explained in the little book which *Paré* published in 1573. He reproduced it in his great work, and lived to see it generally adopted.

D. SEVENTEENTH CENTURY.

I. *Guillemeau*. A great impulse being given to surgery, the art of obstetrics could not long remain behind. *Guillemeau* seized the ideas of *Paré*, and the fruit of his researches appeared under the title of "Easy Labor," a book we find among his works in folio, and in which we see in detail the doctrine of *Courtin*, a celebrated practitioner cotemporary with *Paré*, and the first, perhaps, who lectured on obstetrics. *Guillemeau* understood the operation of turning; he pierced the placenta in cases of hemorrhage, with the insertion of this body over the os uteri, as *Maygrier* has proposed to do in our time. We are, perhaps, indebted to him, more than to L. Bourgeois, for the practice of rupturing the membranes and hastening the delivery, when much hemorrhage takes place during labor. The age in which *Guillemeau* lived was the great age of obstetrics, and from what we have already seen in *De la Touche*, we can no longer doubt that surgeons have only at a comparatively recent date commenced the practice of this art.

II. *St. Germain*. Nevertheless, this science was encumbered with all of the old prejudices collected together by *Avicenna*. If *Guillemeau* ridiculed the old women, who foretold from marks on the new-born child the number that would be born to the mother, *St. Germain*, who came after him, does not hesitate to place a small piece of ice in the hand of the child to make it draw back its arm. Moreover, *St. Germain* acknowledges that he did not practice. He was a physician, and a great admirer of *Guillemeau*, and appears to have had no other desire than to collect what was then known as essential to the practice of obstetrics in a small book, as a manual for the instruction of *sages-femmes*. The latter half of the seventeenth century will introduce us to *Mauriceau*, *Viardel*, *Fournier*, *Portal*, and *Peu*, to whom history and their works accord a conspicuous station among French tokologists.

III. *Mauriceau* particularly, whose work, first published in 1668, ran through seven editions, was the oracle of this epoch. Endowed with great abilities, and with extensive learning, and entrusted as surgeon with the obstetrical department at the *Hôtel-Dieu* in Paris, his practice soon became enormous. His book contains a great number of valuable observations and opinions upon pregnancy, parturition, and the consequences of delivery. He insists still more than *Paré* upon version by the feet. Whenever the child presents in any unfavorable position, he says, from the shoulders to the feet, it is the safest and shortest way to deliver by the feet. Elsewhere, he says, when the child presents its feet, it is better to deliver it in this position than to endeavor to bring down the head. Again, he mentions this in speaking of the presentations of the side of the head. Then, according to him, we ought to introduce the hand into the uterus and bring down the head, or push back the shoulder, or search for the feet. He was aware that delivery was possible in face presentations, and that prolapsus of the cord required version and the extraction of the child; the belly-band ought only to be moderately tight in his opinion. His instrument (*fronde*), or bandage for pulling by the head, makes us feel his want of the forceps, and his fork for carrying up the noose in the application of the fillet has lost its value, since the flattened and grooved end of the canula has been introduced. They show, however, the inventive genius of the author. The practice of *Mauriceau*, however, might have been more successful, although

his work is filled with errors and untenable opinions. He taught that the uterus grows thinner during pregnancy, and that the symphyses do not soften, or become relaxed; that the Caesarian operation ought not to be practiced, except after death, as it never succeeded on the living, "notwithstanding what some impostors have said;" that the child and the placenta should be carried near the fire, in order to tie and divide the cord, etc. Mauriceau was extremely violent and passionate; we frequently find him treating *sages-femmes*, and even his brother practitioners, with malevolence. He declaimed in a violent rage against those who refused to deliver his sister rapidly during hemorrhage, whilst he ought to have decided upon that practice himself in similar circumstances. Here is a sample of his amenity towards Viardel: "The author is grossly ignorant; his book merits rather to be sent to the grocers and butter-women." Differing from R. de Graaf in his theory of generation, he maintained to the last the impossibility of tubal pregnancy. In referring to this subject, it is well to mention here this singular fact. Nearly all of the surgeons and physicians in Paris maintained, with the preparation before them, that, in a case of extra-uterine pregnancy observed by B. Vassal, the fœtus was situated in the fimbriated extremity of the Fallopian tube. Mauriceau, who would not hear of extra-uterine pregnancy, and who is said to have made the delineation of the piece himself, maintained a different opinion, and made it good by asserting that what was taken for a tubal pregnancy was nothing more than a kind of hernia of the uterus at the root of the round ligament. And it appears, at least to judge of it by the figure published by Mauriceau, that it was in reality an interstitial pregnancy.

IV. *Viardel* confined himself to a much narrower sphere than Mauriceau; his book treats only of a few subjects, and almost entirely in a practical point of view. According to him, delivery in face presentations is very dangerous. We should reduce them by placing the ends of the fingers on the forehead, covered with a compress and retained in place by a ribbon held outside. No one had better understood the inversion of the uterus than he, nor indicated better means for its treatment. In flooding, he used the infusion of canella bark and the confection of kermes mineral. We are indebted to him for some curious observations; that of an occlusion of the vagina by the hymen, and that of an abortion of four embryos, among others. Viardel was correct in stating that the discharge of the meconium indicated the death of the fœtus; but, as he adds, "in whatever position it may have been," Mauriceau seized the opportunity of rebuking him severely, and of ridiculing "this book, which the author had placarded at the corners of the streets." *Peu*, who knew that this sign in breech presentations is far from having the same value, had fine sport in ridiculing him in his turn, and handled him quite as severely.

As Viardel was neither doctor, physician, nor surgeon, he strongly excited the jealousy of the whole surgical corps. The trouble which he took to justify his boldness proves that he perfectly understood his position, and shows that without the protection of some great patron he would not have ventured upon this field of science.

V. *Fournier*. A work less known, and which appeared about this time, is that of Fournier.

Upon the same plan which St. Germain followed in his treatise for the use of *sages-femmes*, Fournier wrote one for the use of surgeons and accoucheurs. When we compare it with that of Mauriceau, his book is a sort of manual, similar to that of Rhodion. The author, who already knew how to incise the neck of the uterus, and who had invented an instrument for the purpose, follows dogmatically his subject from the beginning to the end without entering into any detailed observations. He thinks that the cord is sensitive, and gives many plates of monstrosities, particularly of a pair of twins, united by the abdomen in the manner of the Siamese twins. I will remark, with A. Leroy, that up to

this period, no author speaks of Rhodion, or of Rueff, although the plates of Paré, Guillemeau, and of Mauriceau really belong to one of these physicians.

VI. *Portal*. Viardel, who confined himself to the collection of observations, was imitated by Portal, whose last descendant is lately lost to France. A judicious observer, P. Portal has left many important precepts. Seeing that face presentations most often terminate without aid, he did not fear to advance "that there was no more difficulty in them than in any other presentations." In presentations of the shoulder, he took good care not to push back the arm. He maintained that it was not the arm which made the difficulty; that the hand of the accoucheur, with the child's arm together, did not equal the volume of the child's head. He also said first, that in turning, when you have seized one foot, it is not necessary to look for the other. He also saw the placenta inserted over the neck of the uterus, and scarcely reports anything except observations which are worthy of being consulted.

VII. *Philippe Pau*, endowed with a high order of intellect, entered warmly into discussion with Mauriceau, whom he resembled more, however, in his scornful disposition and great activity, than Portal, and was the author of the best didactic treatise on obstetrics which had appeared up to his time. His ideas are perspicuous, well arranged, and clearly explained, and his practice seems to have been very successful. To him we are indebted for the first description of retention of the placenta from hourglass contraction of the uterus. He remarks, that lame women have distortions of the pelvis, and are delivered with difficulty, and that it is useless to amputate the arm in order to bring down the feet; he describes with accuracy the twisting of the cord, and points out the dangers arising from one too short; he also maintains that it is dangerous to leave portions of the afterbirth in the uterus; and that an author (no doubt Portal) was wrong in saying that we have nothing to apprehend from it; that the bellyband, too tightly applied, is dangerous, &c. : but he is a railer and is superstitious. Like Mauriceau, he is always abusing the *matrones*. He states that the child of a woman who had injured herself against a table had its head split open as with a knife, and the halves of it hung over its shoulders! and that the *sages-femmes* rubbed the lips of the new-born child with a gold piece in order that it might become rich! He ridicules Mauriceau, who directed infants to be baptized with a syringe; and he himself believed that a woman who often came to say her prayers near the altar of the virgin at the Hôtel-Dieu, where there was a frightful devil, was delivered of a child which resembled the devil.

With the authors of the sixteenth century we may place *Roches*, *Bonacciolus*, *Sylvius*, *Mercurialis*, *Montain*, *Rousset*, *Cordé*, *G. Boucher*, *Mercatus*, and many others, which may be found in the collections of Spach. In like manner, I should have mentioned *F. de Hilden*, who, as well as his wife, practiced obstetrics; *Diemerbroeck*, who has also treated of it copiously; and *Gélée*, who has given the mechanism of labor: but I have only intended to mention cursorily those who have applied themselves especially to the practice of this science.

VIII. *Chamberlain*. Whilst so many celebrated men flourished in France, England only commenced the course which was but the prelude to her ultimate success in this science. No proper instrument had yet been invented for the extraction of a living child by the vertex. The Chamberlains announced that they had found out the means of accomplishing it. One of them came to Paris to demonstrate the superiority of his method; but not being successful, and being disappointed in the reception he met with, together with having, it is said, excited the jealousy of Mauriceau, he returned home without having communicated his secret to any one, which was probably no other than the forceps, which soon after became so much in vogue.

E. EIGHTEENTH CENTURY—FIRST PERIOD.

The impulse given to science in the seventeenth century still increased in the eighteenth, in following at first old doctrines and principles, that is to say, the ideas of Paré and Guillemeau, extended by Mauriceau and Peu. It was not only in France, but in the whole of Europe, that it was cultivated with such beneficial results.

I. *France.*

Three works which appeared in Paris particularly marked the commencement of this epoch; those of P. Armand, of Dionis, and of De la Motte. These three works reproduced very nearly the methods and doctrines of the last three authors of the preceding century.

a. Indeed, *Armand* may be said to stand between Viardel and Portal. The facts which he mentions concerning the different kinds of labor, hemorrhages, imperforation of the vulva, inversion of the uterus, &c., did not awaken in him any idea of generalization; and his chief invention is a kind of network or fillet, which he used for delivering the head.

b. *Dionis* seems rather to have adopted Peu for his model. Of a gay disposition, fond of raillery, though at the same time benevolent, he dogmatizes and often jests in a very agreeable manner. According to him, moles and false germs result from imperfect conception, and cannot occur except in married women. He thinks a peculiar bed for lying-in women is of advantage, although Mauriceau maintains the contrary opinion. He states that the child ought to be washed in red wine, and that we must not believe those who say, that not more than one woman in a hundred requires the assistance of art; that each twin has its own envelope, and that there is no reason to fear seizing the foot of one for that of the other, as Mauriceau intimates; that the head-band, or sling, of Mauriceau is a beautiful invention which it is impossible to apply; and that whoever practices the Cæsarian operation on a living woman ought to be punished. We must acknowledge, however, that Dionis has scarcely written anything new, and that his name, and the attractive style of his book, have rendered more service to science than any original ideas of the author.

c. *De la Motte*. The successor, or rather the *continuateur* of Mauriceau, is De la Motte. He differs, however, from his predecessor in the mildness of his character, and in not introducing irrelevant matter into his writings, or that which is not supported by a great number of observations drawn from his own experience. Prudent and full of sound sense, he often gives the most excellent advice. With him the summerset of the fœtus is imaginary, the presentations of the breech and feet are normal, the convolutions of the cord around the neck retard the delivery of the child; in whatever manner the fœtus presents, the delivery is natural if it requires no assistance from art; to tampon the vagina in order to keep the cord from escaping is useless; it is also unnecessary to push back the arm in order to seize the feet; and the uterus is thicker during pregnancy than in a state of vacuity. Although De la Motte often defends the *sages-femmes* against Mauriceau and Peu, he sometimes abuses them himself, and in reality his good nature is only apparent. In speaking of the city surgeons, he does not hesitate to say, "Let the fœtus present its head, leg, or arm, whether it is dead or alive; one or two days in labor is preferable to justifying them in the employment of their crotchets."

A little further he ridicules Peu, who regarded the clitoris as being capable of retarding delivery. We find him in two instances accusing the latter of bad faith in a very pointed manner; but all this does not hinder his book from being really better than that of Mauriceau, whose opinions he frequently opposes.

What is astonishing in him is, that, living in a distant province, he has been

enabled to collect such a number of interesting facts, and to digest and classify them in proper order; and at the same time to publish a very good work on surgery.

d. Other practitioners acquired also great celebrity at the same epoch. Desforges was held in great esteem, who continued to practice even after he became blind; also Lacuisse is mentioned, who was accustomed to sleep beside the woman in labor without waking until after the rupture of the bag of waters; and Boucher, who waited in the antechamber during the *travail* of the queen. But particular mention is made of Clément.

e. *Julien Clément* has written nothing; but he was very skillful in practice, and Puzos, his pupil, attributes great learning to him. Called to direct the clandestine delivery of Madame de la Vallière, he soon became the accoucheur of all the princesses, and of a great number of ladies of high birth. It is probably of him that Dionis speaks, who, being obliged to read to the queen for four hours to prevent her from sleeping, blames this custom of depriving his newly-delivered patients of sleep. We see, moreover, by what has been before stated, that Clément is far from being the first man who had been called to attend women in simple labor, as Astruc pretends, and that in France alone there were many accoucheurs before his time.

II. Low Countries.

At this epoch, Holland also came forward to pay her tribute to the science of obstetrics. I shall not speak of Ruysch, who declares that in a practice of fifty years he has never found it necessary to introduce his hand into the uterus to extract the afterbirth, because he is much more celebrated on other subjects; but Deventer ought to be mentioned here as an obstetrician. Both he and his wife practiced obstetrics. Having been originally a watchmaker, he only studied the sciences late in life. Skillful, penetrating, with a clear judgment, he made rapid progress in his new studies. It is to him we are indebted for our first knowledge of the axis of the superior strait, and of the curves of the pelvis. He says that, during pregnancy, the thickness of the uterus does not diminish; it is always the same, or rather thickens, if any change occurs. No one before him had so well described the obliquities of the uterus. The four kinds he mentions are met with constantly in practice. He has only exaggerated the importance of them, in mal-presentations of the child. Deventer had clearly perceived that the labor-pains were expulsive; that it is sometimes necessary to induce delivery between the seventh and ninth month; that before the rupture of the membranes the child is movable enough to present sometimes the head, the feet, or the hands; that it is useless to amputate the arm in shoulder presentations; and that Justine Siegmundin is in error when he directs version to be practiced on the dorsal surface of the fœtus. On the other hand, we may reproach him with some errors—as, for instance, that the hand must be introduced into the vagina to depress the coccyx and the point of the sacrum; that the arms must be left on each side of the neck, for fear that, in contracting, the neck of the uterus may strangle the child, or arrest the progress of the head—and for extolling beyond measure certain pills of his own composition, and directing us to pinch the child's fingers in order to make it draw up its hand. Although his style is generally grave, and his expressions indicate a certain degree of ingenuousness, he shows us that he sometimes over-values himself. The kind of programme which he gives of his talents, and of what he knows how to perform, at the close of his book, disfigures even the rest of his writings, and is only pardonable on account of the usages of the times in which he lived.

III. *England.*

England really enters the list at this epoch. A work entitled "Book on Woman," or "The Birth of the Human Family," printed in 1540; the manuscript of Willoughby, which dates from 1670; the short treatise of Everard; the "Guide for *Sages-femmes*," of Culpepper; the treatise of Thomson; the "Midwifery" of Aristotle, by Salmon; with Chamberlain and his sons or nephews, are all which this nation had produced up to this period. Maubray, who was the first public professor of obstetrics, published his first treatise in 1723, and added a supplement to it in the following year. In 1729, Simson published his "System on the Uterus." Edm. Chapman described Chamberlain's forceps, and wrote a treatise on obstetrics. The collection of Observations by Giffard was printed in 1734. In two hundred and twenty-five cases under the care of that author, we find several which refer to the insertion of the placenta over the orifice of the uterus. In turning, Giffard agrees with Portal that one foot is sufficient, and that it is useless to search for the other. Dawkes, a great partisan of Deventer, published his "*Vade Mecum for Sages-femmes*" in 1736.

A work which was received with great favor, and which was afterwards translated into Latin by Bohemer, is that of Manningham. Originally a pharmacist, Manningham became an accoucheur, and founded a hospital for lying-in women at his own expense. A valuable treatise on obstetrics was also published, in 1741, by F. Oulde, who first demonstrated that the head presented transversely, and not forward and backwards at the superior strait.

IV. *Germany.*

Germany and Switzerland, which have served as the starting-points of the science of tokology, in producing Rhodion and Rueff, remained far behind in this respect in the first half of the eighteenth century. Heister, who, however, was not, properly speaking, an accoucheur, is nearly the only one who wrote upon obstetrics during this time; moreover, what he wrote is contained in his "Institutes of Surgery," published in 1739. But let us return to France, where we are about entering upon a new epoch, a dogmatical era, serving as a crowning-point to the period of observation commenced by Mauriceau, and terminated by De la Motte.

F. EIGHTEENTH CENTURY—SECOND PERIOD.

I. *France.*

There had been, as yet, no public instruction for the generalization of our science, at that time, embracing such a great number of facts. Three men of capacity undertook to fill this vacuum, and they soon shone with the greatest lustre in the eyes of all Europe.

a. Grégoire, of whom little is known, except from what some of his students relate of him, among the number of whom we must mention Smellie, has written nothing; but we know that in his lectures he described minutely ruptures of the uterus, and that Wall has derived from him, in some degree, his ideas upon retroversion of the uterus. To make himself better understood, he made a pelvis of willow covered with leather, and with this he demonstrated the different stages of labor.

b. Puzos. Instructed by Clément, whose ideas he does not entirely adopt, however, Puzos, a member of the Academy of Surgery, was the first who was honored with the title of professor of obstetrics by the authorities of the time. His writings upon some of the affections of lying-in women, upon metastasis of milk, upon the use of emollient injections into the uterus among others, and more particularly his manner of terminating delivery in cases of hemorrhage during labor,

have rendered him much more celebrated than what he has written upon obstetrics, properly so called, has done. Being more of a physician than a surgeon, Puzos everywhere shows an extreme caution, and never approves of those bold measures which we find advocated by Deventer.

c. *Mesnard*, of Rouen, the inventor of a kind of forceps and a curved crotchet, published about this time a very accurate and well-written manual. His method of questions and answers was so much approved of, that, soon afterwards, Baudelocque adopted it as his model.

d. *Levret* became soon after the most celebrated of accoucheurs, and in a short time his reputation extended over Europe. By his instruction and writings he actually governed his age. With a powerfully directed mind he endeavored to subject the obstetrical art as much as possible to the laws of mechanics; so that he describes the pelvis, and explains the contractions of the uterus, with a rigorous precision unknown before his time. His researches upon the insertion of the placenta over the os uteri, and the retention of the after-birth, had already commenced to render him famous; but the invention of the forceps which bear his name especially enabled him to effect a great change in the science. With the assistance of this instrument, which, in fact, Palfin, Gilles Ledoux, Chapman, and Giffard had described after their manner, Levret was enabled to deliver by the head with ease, and often without danger either to the mother or child, a great number of infants which could not have been otherwise extracted, except by using the most murderous instruments. Perhaps he may have over-estimated his forceps. His instrument for extracting the head, his pincer for moles, and for the extraction of polypi, show how great was his predilection for instruments, and some passages in his first work prove that he was not above many prejudices unworthy of so mature a judgment.

e. *Barbaut* and *Deleurye* now appear as shadows of *Levret* and *Puzos*. The treatise on obstetrics by the former announces an excellent practitioner, whose principles are clear and sound enough. It contains a number of interesting facts and observations, which will be found in the body of this work; but we do not find in it any of those leading ideas which give an increased vitality to science.

f. *Deleurye*, who is generally nothing more than a copyist of *Levret*, but whose terse and forcible style is always correct, has also advanced some precepts worth preserving. The honor of having first recognized delivery in face presentations to be accomplished without the assistance of art, belongs as much to him as to *Zeller* or *Boer*. The advice which he gives for depressing the one arm, in order to elevate the other a little, in presentations of the shoulder, has only been rejected because it was not well understood. On the other hand, I scarcely understand how he concludes, as *Justine Siegmundin* does, that in the operation of turning, we should turn the fœtus on its dorsal region.

II. *England.*

a. *Smellie*, a student of *Grégoire*, was in England what *Levret* was in France. His doctrines in London obtained great success, and his works will remain as a glorious monument of the human intellect. The plates which he has given of the uterus, and of the different positions of the fœtus, republished in Latin and in German by *Léonhart Huth*, appear to have been often drawn from nature, and are much superior to those which preceded them. His first volume contains the elementary principles of the science; and his second and third are almost entirely devoted to the exposition of facts.

In this arrangement, *Smellie* follows, to a certain degree, the method of *Mauriceau*. His forceps, his scissors for opening the head, and the depth of his reflections, place him by the side of *Levret*, of whom he was really the rival. Upon the whole, we may say that *Smellie* has collected the more, is the more profuse, the more rich in materials; but that *Levret* is the more fruitful in principles, the

more profound in his discussions and the more skillful in generalization. The one limits himself more to observation; the other prefers rather to create, invent, and establish rules.

b. Burton. A man who lived at the same time, and who soon became the traducer of Smellie, was Burton. His "New System of Midwifery," a badly-arranged and undigested work, is nevertheless filled with useful remarks. His dissertation upon the utero-placental circulation and the nutrition of the fœtus is very able. He cites cases of rupture of the uterus, and of retention of the placenta, and says that the enlargement of the uterus is due to the development of its fibres. He admits the four different obliquities of Deventer, and notwithstanding what Oulde has said, he observed that the presentations of the fœtus are never completely transverse, and remarks that the amputation of the arm is a useless piece of wickedness. With a passion for instruments, he speaks of those of his own invention with great warmth. In fine, Burton was of a highly paradoxical character, a practitioner who had but little experience, and the style of whose work renders it more useful to *savans* than to students. Nothing can excuse his diatribes against Smellie; but we must admit that the latter's not having mentioned his works may have offended him, and may have instigated him to revenge himself upon the reputation of one who was rapidly eclipsing him.

c. Among the accoucheurs of Great Britain, who were the satellites of Smellie, as others in Paris were of Levret, I will mention Kelly and Macaulay, who were the first to propose and practice artificial premature labor in cases of narrowness of the pelvis. J. A. Douglas, who preceded them, was skilled in the practice of Deventer, and his contemporaries reproached him for having placed over his door a placard upon which was written, "Here the Art of Obstetrics is taught for four shillings," in the same manner that Mauriceau reproached Viardel for having posted up a notice of his book at the corners of the streets.

III. *Holland.*

Deventer carried the fruits of his labors into Holland; but this country, naturally the friend of mystery, engaged the attention of Europe particularly, by an instrument which its inventors obstinately kept secret. Roonhuysen, de Bruyn, Titsing, and even Camper, acquired celebrity in the art of obstetrics by means of this instrument, which was nothing more than the obstetrical lever.

IV. *Germany.*

During the same period, we see Rœderer and Plenck spreading the dogmas and aphorisms of Levret in Germany; perfecting, correcting, and enriching science by their own labors; and meriting the honor of being translated. The elder Stein, who has become the Levret of the North by his numerous publications, soon caused their works to be banished from the schools, without, however, really diminishing their worth; for his classic treatise itself is after all merely of small weight in the scale of science. The general movement imparted to the scientific world still flowed from its original source in France, where we shall find it more impetuous than ever.

G. EIGHTEENTH CENTURY—THIRD PERIOD.

I. *France.*

a. A. Petit and Solayrès commence with brilliancy the epoch which conducts us to the present age. Resembling him as a physician, Petit succeeded in a manner to Puzos in teaching. His treatise upon the mechanism of labor, and the celebrated controversy he maintained in favor of prolonged utero-gestation, have placed him very high in public estimation. His opinions, put together in fragments under the form of notes to the translation of Burton by Lemoine, so extolled by A. Leroy, and afterwards published in the form of lectures, in an

extremely negligent and incorrect manner, by Baigueux and Perrot, have not however, produced any considerable effect, and fall really below the reputation of the author.

b. *Astruc*, appointed in 1745 to deliver a course of lectures on obstetrics to *sages-femmes* at the Faculty of Medicine, taught this science as Petit did, although only a physician; but Petit went further—he undertook the practice of it, and became inscribed in the roll of surgeons, which no other doctor of medicine had yet ventured to do.

c. *Solayrès*, a physician of Montpellier, imbued with the idea of Sauvages, came to Paris, his mind filled with the desire of extending the nosological classifications of his preceptor. After having attended the lectures of A. Petit, he attached himself particularly to Péan, who in his lectures had already singularly multiplied the presentations of the fœtus, and the precepts for obstetrical operations. The course of instruction which he soon commenced met with the greatest success. His different classification of obstetrics into orders, varieties, and species, his method of explanation, and the brilliancy of his elocution, drew around him a great number of students, and he was about to be received into the College of Surgeons when he died prematurely, before he could sustain the thesis which he had prepared for the occasion. This thesis and his inaugural address are all that he has left us which is authentic. But one of his students, Dufot, who established himself at Soissons, has published, in the form of a “Catechism for *Sages-femmes*,” an abridgment of his lectures and doctrines.

d. A short treatise which Gilles de la Tourette caused to be written, it is said, by one of his friends for the same purpose, and in which are found here and there some useful ideas, and some remarks upon the elongation of the neck of the uterus during labor, among others, demonstrates to what order of instruction Péan and Solayrès applied themselves.

e. *Baudelocque*. Such is the destiny of men and things! If Solayrès had lived, perhaps Baudelocque would not have honored France. In fact, it was with the ideas of Solayrès, rather than with his own, that Baudelocque acquired such great celebrity. The classification, the geometrical arrangement of positions, the almost mathematical regularity of the manœuvres which distinguish both his manual for *sages-femmes* and his great work on obstetrics, were evidently the origin of his reputation and of his success. Baudelocque had the rare talent of applying skillfully, and with great clearness, the scientific ideas which he derived from others. It was in elaborating and in working with materials, up to this time confusedly arranged, that he was enabled to give to the world a book which will remain in science as a monument of reason and wisdom. His researches upon the Cæsarian operation, upon hemorrhages, etc., have likewise contributed to render his name illustrious; but it is still more by the great number who attended his lectures, and by his immense practice, that he has rendered to our art such astonishing services. It is in this way that he caused its universal appreciation, and enhanced its dignity.

Besides, being elevated so much above his cotemporaries, and having seized the sceptre of obstetrics in the eyes of society, as well as in those of science, Baudelocque, like all great men, must have excited envy in many persons; and in fact he aroused it in a great number.

The practice of symphysiotomy was the origin of his disputes. Sigault, and particularly A. Leroy, who found him among the antagonists of their invention, combated him a long time in a violent and unscrupulous manner. Piet, under the assumed name of *W. Kintish*, launched against his book a violent diatribe in the form of letter in 1800. Nor was Herbiniaux more sparing; and Saccombe pursued him with incredible fury in his “*Luciniade*,” as in all of his other libels. We see, in the case of Baudelocque, how far the shameless impudence of envy, or of enthusiasm, may be carried, by some persons, against those who excel them

in their profession. "The Academy of Surgery has crowned ignorance and bad faith," says Herbiniaux. Millot asks, "By what magic a man so ignorant as Baudelocque has been able to become a professor?" Whilst, on the other hand, Fournier dared to write, in 1817, that the art of obstetrics had obtained the highest degree of perfection, and that, after Baudelocque, it was useless to endeavor to extend any further its boundaries.

Like Mauriceau, Baudelocque was violent, imperious, irritable, and often unjust towards his brother practitioners; but he justified by no act the attacks which I have just mentioned, and his talents, joined to the position which he occupied, much more than his character, were evidently the causes which aroused against him those jealous passions which hastened his death. Some of the contemporaries of Baudelocque, however, still enjoyed a certain *éclat*.

f. Lebas, who had taken part in the discussion of prolonged utero-gestation, published in 1779 a small work, in which there is nothing worth noticing. The employment of ipecacuanha and other emetics, which he recommends so highly during labor, inclines us to think that government was right in not granting to him the direction of a hospital for lying-in women, for which he made application. He tells us that a woman was delivered spontaneously, while A. Leroy was lecturing in the amphitheatre on the necessity of performing the Cæsarian operation upon her. We learn also from him that Consell, who did little else than make translations, and who had been a student of Grégoire, hurried through labor without cutting the umbilical cord in cases of hemorrhage.

g. The great memoir of Simon upon the Cæsarian operation, and the invention of symphysiotomy, brought forward Lauverjat, Contouly, Deleurye, A. Leroy, Sigault, and many others.

h. Lauverjat. Under the title of a new method of performing the Cæsarian operation, Lauverjat has written a small treatise filled with interesting facts relating to different subjects connected with obstetrics; but his review of the proceedings of Sigault, who had operated on a woman named Vespres, both against his advice and the opinion of Contouly, is a diatribe of the most violent character.

i. A. Leroy, naturally critical and envious, commenced several works without finishing any one of them. His natural history of pregnancy and of parturition is his best performance. He observed that the uterine pains were limited to the period of six hours; that protracted gestation was oftener met with in women who had had several children than in a first pregnancy; that the immobility of the fœtus is one cause of monstrosity; and that monsters generally present by the feet. In it also he opposes the use of the forceps. In the historical notice to his so-called work on obstetrics, he abuses Paré, Guillemeau, Mauriceau, and particularly Levret, in order to elevate Rhodion, Deventer, and A. Petit, &c. In like manner he was reviewed by an anonymous writer, who unfortunately exceeded in his turn the limits of justice and propriety, although his analysis is generally spirited and very well written.

A little later, A. Leroy was obliged to defend himself, which he did with more propriety, against an accusation of malpractice which had been brought against him by Lauverjat, Contouly, and several others. It was in a case of inversion of the uterus, which it was not possible for him to reduce. On this occasion, history must admit that the greater wrong was on the side of his accusers, and that the unskillfulness of Leroy could only render such an act pardonable, if it is allowable to seek excuses for slander and malice.

k. Contouly, better known by the pelvimeter which bears his name, did more than A. Leroy for the benefit of the science. His researches upon two newly-invented kinds of forceps, upon the application of these instruments to the superior strait, the different instruments for opening the child's head, the pump for drawing the breast, and the division of the neck of the uterus, are worthy of being

consulted; but he maintains, in opposition to Baudelocque, that the excision of the arm is sometimes necessary in presentations of the shoulder, and we often find his discussions filled with the acrimony which was common to that epoch.

l. *Lambin*, who reduced all of the positions of the head to two, and *Bodin*, who presented a good memoir to the Academy on the division of the neck of the uterus in presentations of the shoulder with proci-dence of the arm, are not of sufficient importance to detain us longer. The same may be said of *Berdot*, *Icart*, *Eloy*, *Larray*, *Noé*, *Tap*, *Telenge*, and of *Piet*, who especially is distinguished by his work on the section of the symphysis pubis, and whose letters upon Baudelocque contain some useful observations.

II. *England.*

a. *Denman*. The science of obstetrics, cultivated with equally great ardor in England, rendered Denman illustrious in this country. Denman, simply the health-officer of a vessel, determined, in order to make his living when he came on shore, to deliver a course of lectures on obstetrics conjointly with *Osborne* at London. He commenced by publishing in 1768, and again in 1773, his aphorisms, like Baudelocque in his "*Catechism for Sages-femmes.*" Denman is one of the first who brought into use the practice of artificially producing premature labor; but he has become particularly celebrated by his observations on the theory of spontaneous evolution.

His plates of the human ovum are inferior to his reputation. The principal book which he has left, and which *M. Kluyskens* has translated into bad French, is a learned work, and full of interesting facts. Nevertheless, on the whole, it suffers in comparison with that of Baudelocque. Bolder in his conceptions, Denman is evidently less methodical, less regular in his ideas, and especially less complete than the French author. Among chapters well written, we often find some very much curtailed; but what contributed so much to his success in England is that he treated, like many of his compatriots have since generally continued to do, of diseases of women at the same time with midwifery, and that he had already given a great idea of his capacity in offering to the public, successively, an essay on natural labor, difficult labor, artificial or complicated labor, uterine hemorrhages, and another on ruptures of the uterus.

b. *Exton*, who admits with *Mauriceau* that the blood coagulates by refrigeration in prolapsus of the cord; *Pugh*, who, in the operation of version by the feet, advises the employment of a canula in order to keep up the respiration of the foetus; and *Hamilton*, preceded this brilliant epoch of Denman.

c. The little work of *Aitken* would scarcely deserve to be mentioned, although it ran through several editions, if the author had not invented the chain-saw, and the double section of the pubis, which has been revived as a new thing in these latter times.

d. *A. Douglas* is noticed on account of his work upon Ruptures of the Uterus, and *Blunt* by his "*Man Midwifery Dissected;*" whilst *Croft* advanced the idea of introducing the cord into the uterus, and hanging it upon the limbs of the foetus; and *Forster*, *Sims*, and *Dease* also set forth their precepts in two small works.

e. In fine, *Dr. Bland* comes forward as if to crown this period by the publication of his "*Observations on Human and Comparative Parturition.*" We must still add, however, the previous labors of *Leake* upon the diseases of lying-in women, upon midwifery, and the disputation of this author with Denman on the use of the forceps; the "*Elements of Midwifery*" by *Moore*; the observations of *Perfect*; the "*System of Midwifery*" by *Spence*; and the memoir of *Tolver* upon the mechanism of labor.

III. *Belgium.*

Herbiniaux. Jealous of Levret and of Baudelocque, whom he could not equal, Herbiniaux nevertheless obtained some notoriety in the Low Countries; his discussions upon the lever, which he modified several times, his researches upon certain vicious conformations of the pelvis, upon polypi, and other subjects connected with obstetrics, may still be consulted with benefit in our time. The memoir of Kok upon hemorrhages, and the use of the tampon; that of V. Solingen upon the relations of the head to the straits of the pelvis; the notes added by Kluyakens to the work of Denman; and the practical school of midwifery of Jacobs, prove also that the science had not been neglected in this country.

IV. *Switzerland and Italy.*

Roemer, of Zurich, followed in Switzerland the movement given to the rest of Europe; and Italy, almost silent in the time of Levret, has, since that period, presented herself with pride. Nannoni, succeeding Tanaron, reviews the French doctrines in the last volume of his surgery, and already notices the theory of spontaneous evolution. Vespa, Tranquillini, Nessi, Morandi, Galleoti, and Malacarne, equally did some credit to this country, and forestalled, in a manner, the celebrity of Asdrubali. Maintained in Paris at the expense of the Roman government, Asdrubali finished by adopting A. Leroy as his model. Returning to Rome, he soon established an institution for the practical instruction of obstetrics, upon the model of those he had seen in France. His work, published at first in two volumes, afterwards in four, with the notes of Scatigna, presents everywhere the complexion of the French school, without ever equaling it in its accuracy or in its precision. It is according to the school rather of a Leroy than of a Baudelocque. Madame Boivin is the only author among us who has been able to draw from it any useful observations, although really it is not a bad book.

V. *Germany.*

Three men governed the whole of Germany almost absolutely during this period: Saxtorph, who, from 1760 to 1802, continued to publish, or caused to be published at Copenhagen, memoirs or dissertations upon midwifery; a student of Røderer, Stein, whose "Art of Obstetrics," republished a great number of times in his country, but which was not translated into French, however, until after the first wars of the revolution; and Boer, whose labors upon the putrescence of the uterus, delivery by the face, and upon a great number of other questions, make us regret that the author did not take the trouble to explain them more clearly. Stark, with his archives and his dissertations; Zeller, with his observations; Steidell, with his different treatises; and Schlegel, with his choice memoirs, deserve, nevertheless, to be distinguished among a great number of others.

H. NINETEENTH CENTURY.

I. *France.*

a. Millot and Saccombe. Without diminishing absolutely in France, the impulse given by Baudelocque to the art of obstetrics became, however, a little less active at the commencement of this epoch. The vagaries and the charlatanism which fill the supplement of Millot, the "Science of Obstetrics" and "*la Lucine Française*" of Saccombe, do not inspire us with greater respect for them than the "*Médecin accoucheur*," the "Advice to *Sages-femmes*," the "Twelve Months in the anti-Cæsarian School," or the "*Luciniade*," or the "Art of Procreating either Sex at Will," of the same authors. It was soon perceived, however, that the method of Solayrès was overcharged with useless classifications. One of his pupils,

whose name is consigned to oblivion, but who is no mystery to his schoolfellows, undertook the reformation of this defect.

b. *Maygrier* had the boldness to attempt this in 1802, at the time when *Baudelocque* was at the culminating point of his reputation. With his thesis upon delivery, this author made his *débat*, who has taught the obstetrical art for such a long time, and to whom we are indebted for a complete treatise, though too tame a copy of what had already been known, and afterwards for the beautiful work, illustrated with plates, entitled "*Nouvelles Démonstrations d'Accouchemens*."

c. *M. Capuron*, who came after him, followed in the same track. With a mind more elevated and more exact, he was much more successful than *Maygrier* in his teaching, in his concours, and in his publications. His work on obstetrics, his treatise on the diseases of women, his medical jurisprudence, his memoir on the presentations of the arm, and a great number of articles in the journals, have made *M. Capuron* one of the authors the most extensively known of this age.

d. One of the fellow-students of *M. Capuron*, *Gardien*, published, in 1808, his "*Complete Treatise on Obstetrics, on Diseases of Women, of Girls, and of Children*." We see by this work that the author had deeply considered his subject, and that he wished in a manner to unite the great work of *Chambon* to that of *Baudelocque*. But besides being diffuse, *Gardien* is often obscure and tiresome to read, and he shows everywhere a dreadful sterility, which has not, however, disgraced his other productions.

e. *MM. Evrat, Danyau, Désormeaux, sen., and M. Deneux*, also at that time devoted themselves to giving instruction; but being drawn away afterwards by private practice, they have scarcely given us anything which their experience may have taught them. We are indebted, however, to *M. Deneux* for quite a number of good pamphlets. His researches upon rupture of the uterus, hernia of the ovaries, thrombus of the vulva, and upon artificial nipples, etc., make us regret that he has not published a greater number of them.

Happily his relation, *C. Baudelocque*, who has already given his observations on convulsions, hemorrhage, and peritonitis, will probably continue his investigations.

f. I would say as much of *A. Dubois*, who by his lectures and position at the Maternity Hospital is the successor of *Baudelocque* and the patriarch of the accoucheurs of the present time, if his doctrines and his scientific researches would not one day be transmitted to us by his son *Paul Dubois*.

g. The same may also be said of *M. Evrat*, since *M. Moreau*, who had likewise obtained a great reputation in teaching, before I commenced it, promises a treatise in which we will necessarily find the materials collected by his father-in-law. What we already possess from *MM. Moreau and P. Dubois* show us what we are to expect from their later works.

h. Up to this period, every one seems to have confined himself to the circle traced out by *Baudelocque*, *Maygrier*, *MM. Lebreton and Moulin*, who have given in tables a sort of recapitulation of their doctrines, which differ only in some minute details. Even *Désormeaux* himself, so learned, and gifted with such a correct understanding, and with such profound information, has seldom surpassed *Baudelocque*. His thesis on delivery by the pelvis, upon abortion, and his numerous articles in the "*Dictionary of Medicine*," assign to him an honorable rank among authors; but he has left nothing original, or which is not generally known.

i. Two women, without contradiction the most celebrated of all *sages-femmes*, *Mesdames Boivin and Lachapelle*, although his pupils, thought that *Baudelocque* had not done everything, and were not afraid to shake off to a certain extent the yoke of his scientific authority. The numerous researches of the one upon the structure of the uterus, and divers other theoretical and practical subjects connected with obstetrics, and her great work on the "*Diseases of the Womb*;" the twelve

memoirs contained in the three volumes of the other; and the high position and dignity of both, form, so to speak, the starting-point of a new era for the science of obstetrics in Paris.

j. Things were in this position in 1823, when I myself commenced to give public lectures. An admirer of Baudelocque, full of respect for most of the authors whom I have quoted, I did not feel myself able, without failing in my regard for them, to adopt all of their opinions without investigation. Finding that the circle was greatly enlarged since the close of the last century, I was forced to draw materials from other countries, and from the provinces, as well as from the works of our schools, and I did not confine myself to classical authors, nor to the productions of this metropolis.

k. Paris has produced nothing of moment since that time. The manual of J. Hatin is too brief a summary, and besides too incomplete, to deserve any other mention; the plates which accompany it may recommend it to *sages-femmes*, though they are often incorrect. That of M. Dugès, more profound and infinitely superior, is better adapted for medical students; but the miserable plates annexed to it, the size of the book, and the inferior character of the type, make it difficult to read or consult, and to a certain degree have impaired its success.

l. Throughout France, the departments have not, so to speak, produced anything except a few isolated works. Those who have wished to bring the whole science together appear only to have had in view the production of a work for *sages-femmes*, like St. Germain, Dufot, Gilles de la Tourette, Dufay, &c. The manuals of M. Remy of Rheims, and of M. Garnot of Brest, have also been written in the same spirit. It is the same with that of M. Chevreul of Angers, who appears to have first proved in France, since Portal and Deleurye, that delivery by the face generally needs no assistance.

m. Some returns prove that there exist in the departments a large number of surgeons capable of cultivating successfully the Art of Obstetrics. The first statistics of this kind which were made public are those which M. Ramoux addressed to the Faculty of Medicine some time ago, relating to the clinics of Colmar and of Liège. M. Pigeottes de Troyes has also published a short clinical table of this kind; but the person who merits the greatest eulogy on this account is beyond dispute M. Pacoud, of Bourg. The returns published every year by this physician, or under his direction, generally contain much interesting matter, and the services which he has rendered to his department by the number of good *sages-femmes* whom he has instructed since 1819, cannot be disputed.

Here we see in what proportions the different presentations of the foetus have occurred in his clinic, from 1822 to 1828, and the summary I have made of them according to his returns:—

Years.	Cases.	1st of Head.	2d do.	3d and 4th.	Face.	Shoulder.	Lower extremities and pelvis.
1823,	1625	1271	137	18	14	28	48
1824,	2085	1615	303	16	15	37	84
1825,	2248	1710	277	13	17	23	90
1826,	3061	2341	539	19	19	36	96
1827,	4180	3201	679	28	6	34	191
Total,	13,199	10,138	1955	94	71	158	509

n. The efforts made by Morlanne to establish a clinic for instruction at Metz, and the "Obstetrical Journal" which he edited during several years, also deserve praise.

o. A man of great erudition, M. Champion, entrusted with a similar institution at Bar-le-Duc, has only given a feeble idea of his capacity in his excellent memoir on the presentations of the arm. With great learning, full of ardor, of an inventive turn of mind, and of large experience, this physician is in a fair way of clearing up a great number of practical questions.

p. The Maternity Hospital at Marseilles is also now directed by a learned professor. M. Villeneuve is the author of an excellent dissertation upon the pelvis, and upon unnatural labor. His remarks upon the vagitus of the child in the uterus are extremely correct.

q. *Montpellier*. An idea naturally presents itself here; it is, that no important work upon tokology has issued from the faculty of Montpellier. The thesis of Delpech upon symphysiotomy, and the summary of obstetrics placed by this author in his treatise on "Surgical Diseases," are, with a certain number of dissertations, all that this school, otherwise so celebrated, has furnished worthy of notice since the time of Baudelocque. Judging from some theses sustained at Paris a few years ago, M. Delmas, the present professor, ought to be the possessor of numerous materials of very great interest.

r. The faculty of *Strasburg*, on the other hand, seems to rival that of Paris in this point of view. The neighborhood of Germany appears to have stimulated it actively. Fried, who established clinical lectures there in the beginning of the last century, has left some souvenirs, which every one endeavors to remember.

1st. *Schweighaeuser*, who, besides his "Archives of Obstetrics," has published divers memoirs upon the use of the forceps, upon the fœtus, the history of puerperal medicine, etc., has rendered real service to science, and deserves more praise than is generally accorded to him.

2d. Yet it is to *Flamant* that the school of Strasburg owes the reputation which it enjoys at this time. An able professor, and of a penetrating mind, Flamant soon perceived that the aphorisms of Baudelocque were not always correct. His efforts to make version by the head common; his ideas upon the employment of the forceps, and of the lever; the numerous theses which he sustained on different subjects before the faculty of which he was a member, place him in an exalted station among French authors.

3d. Everything leads us to believe that his successor, M. Stoltz, who has already translated Schmitt, and made important researches upon the mechanism of labor, upon the changes which the neck of the uterus undergoes during pregnancy and after delivery, upon version by the head, and upon premature labor artificially induced, will be able further to extend his great reputation.

4th. The school of Flamant, moreover, has not been without influence upon some of those which have so much multiplied in the north, and even upon that of Paris, where M. Guillemot learnedly expounds its doctrines, after having modified and perfected them by subjecting them to a severe, but conscientious, analysis in the crucible of experience.

The memoirs of M. Guillemot upon cephalic version, obliquities of the uterus, delivery in presentations of the breech, retention of the placenta, coarctations of the vagina, uterine hemorrhages, abnormal pregnancies, the falling and shortness of the umbilical cord, the theory of spontaneous evolution, double pregnancy, and his thesis upon the pelvis, constitute one of the best *tocologues* of our time.

The schools which MM. Morlanne, Pacoud, and Champion have directed at Metz, Bourg, and Bar-le-Duc, are, in fact, more the offspring of the University of Strasburg than of that of Paris.

s. A practitioner of another order, A. Baudelocque, who, like MM. Colombe, Bazignan, Halma-Grand, and some others, is employed in private instruction at Paris, is also the author of some essays. His manner of practicing the Cæsarian operation, nearly the same with that of M. Ritgen, deserves the oblivion into which it has already fallen; but his method of compressing the aorta through the wall of the abdomen, in hemorrhages, will remain in use, and his forceps for crushing the head (*céphalotribe*) is really a good invention.

t. The work of M. Villeneuve on ergot; the article of M. Dezeimeris upon premature artificial labor; the memoirs and works of M. Duparcque upon the diseases and ruptures of the uterus, and a number of dissertations sustained before the

Faculty of Paris; and the essays of M. Lesauvage of Caën, and of M. Herpin of Tours, upon various tokological subjects, also belong to the history of obstetrics, and would find a place in this notice, if it was not already too long.

II. *Low Countries.*

Without being so flourishing as at the time of Camper, Belgium and Holland may, however, be proud of some of her accoucheurs. M. Ansiaux, of Liège, who is still in favor of symphysiotomy, has been engaged in certain researches and some curious experiments in this operation. The memoir of M. Vandenzande upon the treatment of puerperal peritonitis is one of the best which has been published. We are indebted to M. Wrolick for a good work upon the pelvis of the different races of the human family. The discussion which has arisen between MM. Capuron, Gallandat, and Van Solingen upon the views of the latter on the mechanism of labor, does not allow us to question the vigor of his intellect, and the force of his opinions; finally, we are indebted to M. Salomon for some interesting observations upon the re-absorption of the placenta, and a long memoir upon the induction of premature labor.

III. *America.*

The United States of America, of which no mention has yet been made, has some worthy representatives at the present time. Without mentioning the compendium of Bard, and some other works of a similar value, this country actually possesses distinguished professors in many places in its vast extent.

We find in New York, Dr. Francis, who has translated Denman with annotations; in Philadelphia, Dr. Horner, the author of a short treatise on midwifery, and a learned anatomist; also Dr. Meigs, the translator of one of our works, and who has published a memoir upon the new instruments for extracting the fœtus by the head; Dr. W. Channing, of Boston, already known by his work upon Phlegmasia Dolens; and finally, Dr. Dewees, the best known and the oldest of them all. The memoir of Dr. Dewees upon convulsions, upon the means of facilitating difficult labor, upon inversion of the uterus, upon thrombus of the vulva, and many other subjects, had already familiarized Europeans with his name, when, in 1825, his "*System of Midwifery*" appeared. Although adopting the principles and the classification of Baudelocque, this author has introduced into his book facts which his long experience has enabled him to collect. Convulsions and hemorrhages are treated of at length by him. Some of the other chapters are also complete. As a whole, however, it is very unequal, and is very incomplete as a classical, or standard work; and we must conclude that America has not yet produced an original didactic treatise which rivals those of France, or even those of Great Britain.

IV. *England.*

a. The inheritance of Denman has been disseminated in England, as that of Baudelocque in France. Like M. Dubois, Dr. Clarke has scarcely written anything, although he has long been esteemed the most distinguished accoucheur in his country. Like Maygrier, Dr. Davis, who is in favor of employing decisive means in difficult labor, publishes a work, accompanied by plates, in numbers, after having given one in the dogmatical form. As in Maygrier, so we find in Davis, singular assertions, rash opinions, and a judgment which seems sometimes to be deficient in rectitude. Like M. Capuron, Dr. Burns has prevailed over all of his countrymen in the success of his principles of midwifery; and like Désormeaux, Dr. Merriman has become one of the most esteemed of scientific authorities. Like M. Dugès, Dr. Ryan has collected together in a manual, and very well digested, all that we possess which is excellent upon the science of tokology. Like M. Hatin, Dr. Jewel has published another one much less complete; and A.

Baudelocque has endeavored, like Dr. Holmes, to invent a forceps capable of breaking up the head of a fœtus. In imitation of C. Baudelocque, or as Pasta, Leroux, Rigby, and Bigeschi had done before him, Dr. Ingleby has given an excellent treatise on uterine hemorrhages; and the essay of Dr. R. Lee tends in some sort to the same end as the memoir of Dance upon uterine phlebitis. Finally, we may here oppose the Dublin practice, the "Vade Mecum" of Hopkins, and one of Dr. Power, to that of M. Chevreul, and to the abridgment of M. Remy. The manual which Dr. Maunsell has just published is one of the best which is possessed. But England has no woman who can be compared to Mesdames Boivin and Lachapelle, nor a work which has been conceived upon so grand a scale as that of Gardien.

b. Conquest, who divides with Chaussier the honor of having first discovered the utility of the extract of belladonna in certain labors, and Ramsbotham, whose collection of observations deserves great esteem, cannot be placed in the same rank with Schweighaeuser and Flamant. The researches of Gooch, and of Dr. J. C. Douglas, on the doctrine of spontaneous evolution, and afterwards the work of Barlow, on the premature induction of labor, ought rather to take rank with those of the school of Strasburg.

c. Moreover, it is not on that side of the Channel that the method and principles of Baudelocque have exercised a great influence. Douglas, Sims, and Davis, &c., have continued to advise the amputation of the arm, and evisceration or embryotomy, in some presentations of the shoulder with descent of the arm; and Dr. Lee was not afraid to publish a memoir to justify this doctrine in 1828. Dr. Merriman has endeavored to prove that the child does not often present itself at the straits, except by the head, the shoulders, or the pelvis; and neither he, nor any of his countrymen, are contented to describe the six positions of the head as imagined by Solayrès, or the eight varieties indicated by Flamant. I ought also to add that almost all the English writers regard, as M. Capuron does amongst us, the occipito-posterior positions as unnatural, and that they are in general not so fond of waiting in protracted cases as the accoucheurs of the French school.

d. Burns. The number of their schools in London, Ireland, Scotland, or in the provinces, explains the number of partial works published by them, and equally accounts for the little influence exercised by their classical works upon the rest of Europe. One would say that each one of them only seeks to enlighten his own hospital, and that no one in that country thinks of going beyond the sphere of his students. Thus their treatises are formed simply of recapitulations, in which the subjects are seldom profoundly treated of. The treatise of Dr. Burns, for example, which is in its eighth edition, and which is certainly the best elementary work of the country, does not include less in a single volume than all which concerns delivery, and the diseases of women and children. Now, can it be supposed by those who are acquainted with the actual state of the science upon this triple division of medicine, that it is possible for it to be properly treated of in so few pages? This work, although very well printed, offers one defect which considerably interferes with the reading of it, and which the author ought speedily to remedy. It is that we find nowhere, at the head of divisions and subdivisions, the subject upon which he treats.

e. Dr. W. Campbell, who has done for Edinburgh what Dr. Burns has accomplished for Glasgow, has not fallen upon the same quicksand; but we may inquire what end he had in view in publishing his work? In fact, it is evidently less complete than that of Dr. Burns, as it embraces the same subjects without clothing them in colors sensibly different. If he discusses with acuteness, if he enters profoundly into some subjects, he treats others with a levity really surprising. It is thus that he leaves the theory of evolution in the same state in which Denman left it; he seems to be ignorant of almost all which has been said during thirty years upon prematurely induced labor, upon delivery by the face,

and version by the head; and yet Dr. Campbell ought to be a learned man and a skillful professor, even from the appearance of his book!

f. The same reproaches might be addressed in a measure to Dr. Blundell, if, by his great reputation in London, and his success in teaching, he had not in some manner contracted the obligation of delivering for publication the materials of his public lectures.

We may well think that the surgeon who has performed the greatest number of amputations of the uterus, who does not hesitate to propose resection in caries of the pubis, and who practices transfusion of blood in hemorrhages from the uterus, would not have limited himself to the simple reproduction of that which others had advanced. Nevertheless, we must avow that the book of Dr. Blundell is not so good a one as that of Dr. Burns. It would be even much inferior, if Dr. Castle had not taken the pains to add to it a great number of notes. The great maxim of the author in his lectures, and which he repeats to satiety, is, "Arte, non vi." His boldness and his enterprising spirit do not prevent him, as we see, from being prudent and reserved in practice. The figures placed in the text, as we see in modern picturesque publications, certainly enhance the value of the book; but it is vexatious to observe that Dr. Blundell, who has just resigned his professorship, has thought proper to confine himself to the simple exposition of his own principles, and has not deemed it necessary to give his opinions upon the actual state of the science. A dogmatic treatise, made for students, or for the purpose of demonstrating what is necessary to be known at the time of its appearance, belies its title, if the author does not bring forward in it, by the aid of a careful review, and by an impartial application, all of the theories, as well as the principal facts, which precede and have entered into the domain of science.

g. The taste for statistics appears to be increasing more and more in England. Bland and Merriman have given examples of it in several passages of their books. A table published in 1824, without the name of the author, from the Dublin Hospital, and in which more than one hundred thousand cases of labor are returned, proves that they had adopted it a great while ago in Ireland. We see by the publications of Drs. Cusack, Hart, Gregory, Maunsell, Kennedy, etc., in the Dublin Hospital Reports, or in the journals of medicine, that accurate statistics are kept in the public establishments of that city, in which Dr. W. F. Montgomery, now professor in the Royal College, who has inserted in the "Encyclopedia of Practical Medicine," and other periodicals, many articles upon midwifery, pregnancy, and some of the diseases of lying-in women and of the fœtus, seems to endeavor to walk in the footsteps of Clarke.

h. *Manchester* seems in its turn to rival *Glasgow* in the practice of the art of obstetrics. The researches of Dr. Radford upon the placenta, upon version, the forceps, ruptures of the uterus, and upon some deformities of the head of the fœtus, etc., indicate that he is a man of learning and of sound judgment.

The memoir of Robertson upon displacements of the uterus, and another upon the ruptures of this organ, also point to him as a distinguished accoucheur.

i. Finally, we must add to all these names that of Dr. Ramsbotham, the son, who now teaches in London; that of Dr. Malin, his rival; that of Dr. Waller, who has given the last edition of Denman; of Dr. Ashwell, who ought to replace Dr. Blundell at Guy's Hospital; and some others whose works I have not read, or do not remember.

V. *The Peninsula.*

No country appears to be so far in the rear as *Portugal*. Langsdorf stated, in 1798, that he had found there only one work upon obstetrics, a work which is nothing more than the translation of the worthless book of Raulin; and I am not aware that since that time, the country of Zacutus, of Amatus, and of Rodric a

Castro, has gained much in this respect. *Spain* is not much farther advanced. Alphonso de Caranza is scarcely known in France, and the same may be said of Nunez. Vidart and Novas have never produced much impression even in their own schools. Besides, it is to be feared that the constitution of their government, and the political excitement which agitates them, may repress for a long time all scientific movement in these unhappy countries.

VI. *Switzerland and Italy.*

Switzerland, which the works of J. Rueff and F. de Hilden had rendered illustrious, also remains in the most absolute apathy in relation to this science. Since the translation of Denman made by Roemer, she can only lay claim to the manual of Hoffmann, and to a few observations of Mayor, to whom we are indebted, moreover, for the invention of the model of a pelvis made of brass wire, a very ingenious contrivance which may be moulded into a thousand different shapes, and which may thus enable us to represent its various malformations, and to see all the particularities of the manœuvres and mechanism of labor.

Italy deserves infinitely more merit than the Helvetic cantons, without at all rivaling England. The instrument for extracting the head, by Assalini, and his memoirs on several subjects connected with midwifery, still possess some value in the eyes of the learned. In his translation of Stein, Monteggia shows that he well understands the doctrine of spontaneous evolution; and it is to him that we are indebted for the first experiments on this interesting subject. Extended treatises, however, have become rare with them, in comparison with those which appeared in the last century.

The obstetrics of Vallé, the modern *sage-femme* of Valota, and the more comprehensive treatises of Valli, of Vespa, and some others, have not been republished. The treatise on hemorrhages of Bigeschi; the observations of Trinchinetti upon abortion and perforations of the perineum, etc.; the memoir of M. Galbiati on pelviotomy; the translations of Catolica; the researches of Mojon upon delivery of the afterbirth, of Balardini on ergot, of Biancini on the utero-placental circulation; and the publication of some isolated facts—those which we owe to Ferrario, and to Bili, for example—on premature delivery, show sufficiently that all professional zeal is not extinct in the country of Morgagni. Besides, its numerous obstetrical clinics have, and still furnish every year very instructive statistical returns. Bongiovani, a great while intrusted with that of Pavia, has moreover left a complete manual, though mediocre, for the use of *sages-femmes*. It is at Pavia that Omoboni, Lovati, and Ciniselli were educated, whose memoirs, inserted in the “Universal Annals” of Omodei, have almost all been translated into the French journals under the head of extracts. The obstetrical statistics of Florence, published by Mazzoni, the successor of Bigeschi, are among the most learned, and most exact.

No general treatise upon this subject has appeared, however, as I have before said, calculated to engage attention, since the republication of Asdrubali; but the science may hope for others from the number of obstetrical schools established in this country.

VII. *Germany.*

Germany has made better use of its resources, and deserves more credit than Italy.

a. Russia. The clinical lectures of Moscow, established about the middle of the eighteenth century, under the direction of an able surgeon, prove that Russia even then recognized the utility of skillful accoucheurs. The history of this clinical establishment, and the scientific results it has furnished, have enabled G. Richter to publish, in 1810, a book too little consulted by practitioners. The statistical returns, the tables, and the comparative summaries which it con-

tains, place it in the same class with that of Merriman, and have not hindered the author from adding to it quite a number of interesting observations: 1. Upon retroversion of the uterus, which he says he cures by means of a *hystéromochlion*—that is to say, an instrument of which M. Amussat believed he originated the first idea, and which is adapted to raising, redressing, and maintaining the uterus in its proper position. 2. Upon prolapsus of the uterus in the gravid state. 3. Upon poylpi, one of which weighed four pounds and a half, and which he cured by a ligature. 4. Upon the cries of the child in the uterus, and upon many other subjects.

b. In Livonia, de Deutsch, director of the Maternity Hospital at Dorpat, and his son, have published a method of version which the Clinique des Hôpitaux, and the Bulletin of Ferussac, have republished by extracts.

c. Denmark. The name of Saxtorph has continued to render Denmark illustrious, and no country has produced so many writings upon midwifery, in the nineteenth century, as the Germanic kingdoms.

d. The University of Gottingen will boast for a long time of having possessed Osiander, who, like Flamant, has endeavored to direct attention towards version by the head. His memoirs for accoucheurs, his pragmatistical history of the art of obstetrics, his manual, or his great treatise upon the science which he has so long taught, disclose in Osiander an original character, a bold spirit, and often a paradoxical critic. He defies any one to show him a single umbilical vesicle in four aborted embryos. He thinks the forceps necessary once in two or three cases; he is even accused of having often applied this instrument for the sole purpose of instructing his students. On the whole, Osiander forcibly recalls A. Leroy to our minds, but under colors infinitely more noble and more elevated; in the same manner in which Boer recalls the likeness of Bandelocque, but softened, and reduced to his purely practical characteristics.

e. The inheritor of the chair of Osiander in the University of Gottingen, Mende first brought himself into notice by the emission of a singular opinion, to wit: That the laceration of the perineum is rather increased than prevented by the manœuvres generally recommended for the support of this part during labor. His position, and the articles which he published in a journal edited by him, conjointly with two other accoucheurs, of whom mention will be made in the sequel, acquired for him some renown, but he was still far behind his predecessor in this respect at the time of his death.

f. Wigand, of Hamburg, is one of those who have most insisted upon the importance of observing the spasmodic contractions of the uterus, and upon the benefit we may derive from external manipulations, when it is desirable to change some mal-presentation of the fœtus.

g. The Siebolds, who are attached to the University of Vienna, have, in some measure, reproduced or continued the archives of Stark. By their journal, their teaching, their practice, more perhaps than by their own researches, they have assisted to spread the taste for obstetrics in all the northern countries.

h. The treatise on feigned pregnancies by Schmitt; the extremely learned volume, filled with experiments, observations, and with researches of all kinds, which Hohl has published upon auscultation as applied to the diagnosis of pregnancy; the work of Michaelis upon the Cæsarian operation, version by the feet, and the precidence of the umbilical cord; and the statistical and topographical work of Riecke, of Wurtemberg, in which two hundred and twenty thousand cases of labor are analyzed, also deserve great praise.

i. Science is also indebted for some observations of interest to D'Outrepoint, of Wurzburg, a student and partisan of Flamant, who, like him, was in favor of version by the head.

j. The memoir of Reisenger upon the artificial induction of premature labor,

the history of obstetrics up to the nineteenth century by Meissner, the excellent dissertation of Kohlschveter upon the different lengths and twisting of the cord, must tend to the ultimate perfection of tokology.

k. Besides the manual of Jorg, and that of Froriep, which are not without value, Germany actually possesses several valuable works which tend to render it more and more flourishing, by forming the nuclei of as many distinct schools. It is in this manner that Ritgen in Giesen, Carus in Dresden, Busch, first in Marburg and now in Berlin, Nægèle in Heidelberg, and Kilian in Bonn, have initiated us into their doctrines, each in a general treatise.

l. The first of these authors, Ritgen, who appears at first to have studied veterinary medicine, the author of a new process for the Cæsarian operation, has so often practiced the operation for the artificial induction of premature labor, that it may be even doubted whether it was not sometimes unnecessarily performed. Almost all of his opinions are paradoxical, and his works ought not to be read except with a certain degree of caution.

m. Carus, whose researches in zoology, and in comparative anatomy and physiology, are now appreciated in all Europe, possesses the most exact mind, but he has not been sufficiently occupied in practice. So that the theoretical portions of his *gynæcologie* (science of women) are much better treated of than the purely practical part.

Carus could not adopt the ideas of Nægèle upon the mechanism of labor; nor those of Ritgen, who maintains that the occiput looks oftener behind than forwards at the superior strait. His principles differ but little from those adopted in the French works which have issued from the school of Baudelocque.

n. The manual of W. H. Busch is distinguished by other characteristics from the productions of this professor, whom we must not confound with the elder Busch of Strasburg, nor with J. L. or H. L. Busch. No subject in it is profoundly investigated, but all are entered upon, and it terminates by mentioning 2,475 works relating to obstetrics. In it the science is well enough represented, although we find here and there precepts and opinions which merit a different judgment. In rupture of the uterus, for example, M. Busch does not hesitate to practice the Cæsarian operation. According to him, the uterus ruptures more frequently in front and on its side, than behind; the placenta becomes adherent to the uterus by a cellular or fibrinous tissue, by a deposit of albuminous, cretaceous, or osseous matter. These deposits are sometimes owing to an alteration of the deciduous membrane. The cause of the degenerations of the placenta is referable always to external violence, and to chronic inflammation; the production of artificial labor is indicated even in cases of convulsions, and in rupture of the uterus. His method, which consists in pushing up one part of the infant, in order that the head may descend of itself, ought to be entirely rejected. Besides, he establishes, very clearly, that, before the rupture of the membranes, it is impossible for the child to cry in the uterus; that occlusion of the neck of the uterus after fecundation very seldom occurs; that a too strongly resistant hymen may cause a rupture of the vagina; that, whether extracted or not, the foetus dies at the full term of gestation in extra-uterine pregnancies; that spontaneous evolution, of which Rathelot also relates an example, is accomplished in three ways, according to the manner in which the waters are drawn off; and that the infant descends by the head, or by the breech. Upon the whole, this book is a succinct abridgment, and generally correct, and may be put into the hands of students, although it is very insufficient for them and for practitioners.

o. Already known by his work on the foetal circulation, the axes of the pelvis, and as connected with the clinic of Prague, and also by his translation of Burns, Kilian has just published two volumes, the first part of a very learned treatise upon the operative division of obstetrics. This work, in which we often perceive the style and doctrines of Nægèle, reproduces almost all that has been said

upon the subject. His article upon artificially induced labor is one of the most complete; but he does not treat so well of evolution and version, except, however, of cephalic version, which he appears to have thoroughly studied. We are surprised, however, to hear him say that the Cæsarian operation is preferable to perforation of the cranium; that the head being engaged in such a manner as not to allow us to displace it with the forceps, ought to be perforated, although the child is alive; and that symphysiotomy would only be useful when the pelvis is regularly contracted. If the indications and the appreciation of the subjects treated of in this book are not always precise, it has not less the advantage of exhibiting them in a very favorable light, and in an extended sense.

p. The individual in our time who has caused the greatest sensation in the science of tokology in Germany is, without contradiction, Nægèle. The successor and son-in-law of Mai, who first practiced artificial premature delivery beyond the Rhine, Nægèle has become one of the most celebrated professors of Heidelberg, where are found, besides, the Tiedemanns, the Cheliuses, and other remarkable men. His volume, which dates from 1812, treats thus early of menstruation, of retroversion, deformities of the pelvis, some anomalies of the vagina, and of certain methods in teaching tokology, with peculiar care; and it is in it that his cases are given with his process for operating with the suture in vesicovaginal fistulas. His work upon the pelvis, his dissertation upon *céphalæmatomes* (sanguine tumors on the head of new-born children), upon atresia of the vagina, upon exostosis of the pelvis; his memoir upon the diagnosis of tumors on the cranium; and a number of other theses sustained under the presidency of Heidelberg, have introduced into the science ideas and facts of an importance which no one disputes at the present day. But it is chiefly to his method of explaining the mechanism of labor that he owes his renown. No one before him had stated in so formal a manner that the antero-posterior diameter of the head almost always corresponds to the left sacro-iliac-cotyloidian diameter of the superior strait; that it is the parietal, and not the occipital, bone which engages first—the cheek, and not the whole face, which first shows itself in presentations of the face—the ischium, and not the whole breech (*podex*), in breech presentations; and that, in arriving at the inferior strait, the head does not engage in it before having completed the movement of rotation. This doctrine given in 1819, translated in the ninth volume of the “*Journal Complémentaire*” in 1821, and reproduced, in December 1833, in the “*Archives Générales de Médecine*,” is well described in the last edition of the manual of the author, which appeared in 1833.

Designed for the instruction of *sages-femmes*, this book, from which I have endeavored to extract the principal precepts, only gives, however, a very incomplete idea of what the science owes to M. Nægèle. Besides that which concerns the mechanism of natural labor, and the consequences of child-birth, it contains in fact but a small number of new observations.

q. The statistical returns of Merrem of Cologne, those of Kluge, and some precepts of the latter relating to the Cæsarian operation, or to artificially induced labor, would also deserve to be commented upon, if it were possible to review all the works upon this subject published in Germany during the last thirty years.

§ 3. CONCLUSION.

Incomplete as it is, this simple *coup-d'œil* will suffice, I hope, to prove that in our day the true science of tokology has taken an elevated position, and that its march still tends rapidly towards perfection. It shows, also, that England, and especially Germany, are aroused, and that their progress is now more rapid than that of France. After having given the impulse to, and served as the cradle to the art of obstetrics, the period has arrived when the country of A. Paré is really in danger of allowing herself to be surpassed, if she does not hasten to

seize again the sceptre which Baudelocque acquired for her. The reason of this is, I think, easy to comprehend. It is at least partially due to our institutions, to the method of instruction, and not to our scientific men; to the administration of our government, or our social habits, and not to our practitioners or to our universities. Indeed, in all of the universities, and in all of the schools of which we have made mention, whether in Italy, America, Ireland, Scotland, England, Russia, Denmark, or Germany, the students and physicians attend the lectures and the practice of obstetrics at the bedside of the patients, in company with skillful professors who direct their studies. In France, on the contrary, nothing of the kind exists. In almost all the cities in the provinces, the hospitals contain, it is true, a lying-in ward; but only a few students are admitted into it, as if by especial favor, and a *sage-femme* in chief, attached to the establishment, directs its whole service under the supervision of a surgeon who is rarely present. In Paris, the Hôtel-Dieu and the Hospital Saint Louis receive every year from three to six hundred women, at the beginning of labor. *Sages-femmes* are not employed in them; but the lying-in wards, making a part of the general surgical department, are given in charge of the students of the house, who, not being stimulated or directed by any one, derive very little instruction from them, and they often, indeed, regard as a drudgery the obligation they find themselves under, each in his turn, of watching the different phases of labor, and of remaining near the woman during her delivery. La Maison d'Accouchement, where there are more than two thousand deliveries a year, an establishment as admirable as it is extensive, and which Madame Legrand directs with great skill, might serve for the instruction of six hundred students; but, by a singularity which no one can comprehend, this immense treasure is entirely consecrated to the use of about one hundred *sages-femmes*, who leave it every year, and who, once free, have no other mission, no other aspiration than that of managing simple cases of labor! No student, no physician (those who in private practice are engaged in all difficult cases) can ever enter there! Never, perhaps, has so rich a mine been so unfavorably worked. Morals and humanity, which are invoked in order to forbid our access to it, are only outraged by the sterility of such a noble institution. What is more conformable to morality and humanity than to render skillful and learned those whom their profession calls to succor and to guard women against the accidents and dangers of child-birth?

Since the time of Levret and Grégoire, private schools have always been numerous in Paris; but in these schools, those of simple *sages-femmes*, among whom we still distinguish Mesdames Dutilleux, Lacour, Lachapelle (niece), Mercier, etc., what can they accomplish? What do we see? The lectures of one course last about two months. From four to eight accouchements constitute the practical part of it, and the most diligent and zealous students only attend them. The woman is lost sight of as soon as she is delivered. The professor is present as little as possible. One or two women, pregnant or not, and often the same individuals, present themselves two or three times a week for the exercise of touching, and it is necessary for from twenty to forty students to practice this operation in an hour. What inducement, what instruction can such a system, as well carried out as can be imagined, offer to students? It is, however, the only one by which they are enabled to profit in France, unless it is at Strasburg, where *sages-femmes* are not in possession of the lying-in ward, and where also the students of medicine are admitted to the clinical lectures.

Thus tokology is taught at Paris in the nineteenth, just in the same manner as it was in the seventeenth and eighteenth centuries; and since Baudelocque, as in the time of Mauriceau, Levret, or A. Petit. Can all the avenues to the practice of a science so essential still remain for a long time closed against students in France, when they are so liberally opened to them everywhere else? No; it is not possible that a fact which contrasts in so marked a manner with instruction in the other

branches of medicine can longer persist among us. Already an alteration is in preparation. An energetic clinic, confided to an illustrious name, an able professor, is about to be established near the University of Medicine by the efforts of its skillful dean; but yet this is not enough. Our country and its metropolis ought to have a larger and more complete institution in this age. It is necessary that the doors of the Maternity Hospital should be thrown open to the students of medicine, and that several professors should deliver free lectures in that institution; that an accoucheur also should give a public course of instruction at the Hospital Saint Louis; that another course should be given especially at the Hôtel-Dieu; that there should be in the capital from four to six tokological clinics, as there are from twelve to fifteen for medicine; and soon, I feel the conviction, the science of obstetrics will again resume that pre-eminence with us which, twenty-five years ago, was not disputed, and which belongs to France, placed as she is at the present day foremost among liberal and scientific nations.

A COMPLETE TREATISE
ON THE
ART OF ACCOUCHEMENT:
OR,
TOKOLOGY, THEORETICAL AND PRACTICAL.

BOOK I.
ANATOMICAL DIVISION.

IN a tokological point of view, anatomy is naturally confined within very narrow limits—embracing merely the inferior extremity of the trunk—that is to say, the pelvis and its connections, the sexual organs and their appendages.

PART I.
OF THE PELVIS.

THERE are two conditions of the pelvis, which it is of importance not to confound, a *normal* and an *abnormal* condition.

CHAPTER I.

NORMAL CONDITION OF THE PELVIS.

THE difference between the pelvis of the skeleton and the one to which the soft parts are attached, is so great that we are compelled to study them separately.

SECT. I.—OF THE DRIED PELVIS.

The pelvis, a sort of bony girdle or cavity which constitutes the inferior termination of the trunk of the body, is found, in the human species, between the spine, which it supports posteriorly, and the thigh bones, on which it rests anteriorly. Its shape, which is very irregular and difficult to describe, resembles in

some measure that of a cone, with its apex and base strongly inclined towards each other, on their anterior face. Regarding it as an appendage both of the vertebral column and of the inferior extremities, the anatomists who lived antecedently to the time of Vesalius gave no particular description of it. Diemerbroeck, Dionis, Saint Hilaire, Mauriceau, and De la Motte scarcely dwell for a moment upon it in their works; and even at the present day the learned who aim to promote the honor of what is called philosophical anatomy, have, for the major part, returned in this respect to the same way of thinking as the ancient naturalists. But although the development of the skeleton might, in a system of general zoology, permit us to take such a view of it, it does not follow that we ought to do so in tokology. The accoucheur must necessarily study the pelvis as a portion distinct from, and, as far as connected with his art, independent of, the rest of the body. Hence it is that all authors since the time of Smellie, Levret, and Deventer, have followed this course; which I shall accordingly adopt.

ART. I.—OF THE BONES OF THE PELVIS.

There are four bones in the adult pelvis; the sacrum and coccyx posteriorly, and on the median line; and the coxal bones in front, and on the sides. As he who is destined to engage in the practice of midwifery ought to be made acquainted with the entire pelvis, I do not deem it necessary to dwell at length upon the graphic details that are to be found in most of the classical works upon each constituent portion of it. On this subject there exists, even in our most modern works, quite a faulty mode of exposition, which it is proper to reform: after the manner of Baudelocque, the pubis, the ilium, and ischium are minutely described as so many separate bones, while, for the most part, the coxal bone is almost entirely lost sight of; and yet it alone possesses any considerable interest in relation to midwifery, inasmuch as the three pieces of which it is composed are united into one before the individual is liable to become pregnant.

§ 1. OF THE SACRUM (*os sacrum*, *s. clunium*).

The sacrum, a single bone, situated between the last lumbar vertebra and the coccyx, is locked in, as it were, between the two ossa ilia.

Of a triangular or pyramidal shape, curved forwards on its anterior surface, it presents to the examiner, successively, an internal or pelvic region, an external or posterior region, two edges, a base and an apex.

Its *anterior surface*, somewhat concave, presents, 1. Along its middle, four or five quadrangular facettes, and the same number of transverse lines; 2. Outwardly, the five anterior sacral holes, terminating in an equal number of converging grooves, for the passage of the anterior branches of the sacral nerves; 3. More outwardly still, and between these openings, certain rough, uneven surfaces for the attachment of the pyriforme muscles.

Its *posterior surface*, which is convex and very uneven, exhibits, along its middle, a series of protuberances which, by their union, constitute the crista of the sacrum; above this crest is seen the opening of the sacral canal; below are the two branches formed by its bifurcation, the triangular space which terminates the spinal canal, and the tubercles or points called the horns of the sacrum. On either side of the false vertebral spines, are seen the sacral grooves, the posterior sacral holes, and still nearer to the edges of the bone are to be found certain rough surfaces that serve for the attachment of the posterior sacro-iliac ligaments.

Its *edges* may be divided into two portions; one, superior, and very thick, exhibits, on its anterior half, a semilunar articular facette which unites it to the coxal bone; on its posterior half, a hollow, and certain rough protuberances for the attachment of the sacro-iliac ligaments; the other, inferior, thin, and almost sharp, serves for the insertion of the sacro-sciatic ligaments.

Its *base*, very broad, looks upwards. On its middle may be seen a plain elliptical surface, situated transversely, inclined more or less backwards, and which is articulated with the last lumbar vertebra; outwards and a little forwards, a triangular surface, the *lesser wing of the sacrum*, which is slightly depressed towards its anterior face, and concurs in forming the internal iliac fossa; lastly, we observe, on the posterior surface, the opening of the sacral canal, and the two articular apophyses of the first piece of the sacrum.

Its *apex*, thin, elliptical, slightly convex, is received into the base of the coccyx.

The sacrum, a simple prolongation of the spine, is formed by the union of five vertebræ. Nearly forty points of ossification may be observed in it; at birth, it is still formed of fifteen pieces, three for each vertebra; but soon afterwards it only exhibits five, which, also, always coalesce before the age of puberty.

§ 2. OF THE COCCYX (*ossa coccygis*).

The coccyx is a sort of rudimental sacrum, whose anterior face, almost plain, supports the end of the rectum, while its posterior surface, slightly convex, is only separated from the skin by the posterior sacro-coccygeal ligament. Its edges serve as points of attachment for the small sciatic ligament, and ischio-coccygeus muscle; its base, somewhat concave, surmounted laterally by two prolongations resembling horns, is articulated with the apex and cornua of the sacrum. Its apex, tubercular and rounded, gives insertion to the external sphincter of the anus.

The three or four pieces of which it is composed, mere vestiges of an equal number of vertebral bodies, remain for a long while movable upon each other; however, they at length coalesce; but, in most women, the bone, as a whole, loses its power of moving upon the sacrum only at a very advanced age.

§ 3. OF THE COXAL BONE (*os coxale*).

The bone of the *ilium*, the *hip bone*, the *nameless bone*, or, more properly, as was long ago indicated by Celsus, the *coxal bone*, situated between the femur and the sacrum, alone forms the two anterior and lateral thirds of the pelvis.

Of an irregular quadrangular shape, looking as if strangulated at its middle, and twisted in two opposite directions, the coxal bone exhibits two surfaces and four edges.

On its *internal* or pelvic surface, which is divided into two nearly equal portions, we distinguish, above, a large excavation called the internal iliac fossa, which is filled by a muscle of the same name; behind, an articular surface, of a semilunar shape called the articular facette; still farther behind, certain rugosities, similar to those observed on the edge of the sacrum, with which they unite.

On its inferior half, and posteriorly, is seen a plain, almost triangular surface, which corresponds to the cotyloid cavity, and to the body of the ischium; in its middle, the sub-pubal opening; in front, the internal face of the pubis, and of the ischio-pubal ramus.

A semicircular edge, thick, smooth, and rounded posteriorly, thin and sharper in front where it terminates in the crista of the pubis, an edge which forms the greatest part of the superior strait, and unites these two halves of the pelvic surface of the coxal bone.

Its *external* or femoral surface exhibits, on its upper half, what is called the external iliac fossa, filled by the three glutei muscles; below, the sub-pubal hole, the external face of the ischium, and ischio-pubic ramus; in the middle, the cotyloid cavity.

Its *upper edge*, or the iliac crista, thicker both posteriorly and anteriorly than in the middle, twisted like an italic *s*, divided by the anatomists into an external lip, an internal lip, and an interstice, for more conveniently describing the attach-

ment of muscles, terminates in front by the anterior superior spine of the ilium, and behind, by the posterior superior spine of the ilium.

Its *lower edge* presents three portions; superiorly, an oval surface for the articulation of the pubes; inferiorly, the tuberosity of the ischium; and in the middle, the edge of the ischio-pubic ramus, turned somewhat outwards.

On its *anterior edge*, proceeding from above, downwards, and from the ilium towards the pubis, we remark the superior iliac spine; a small semilunar notch; the inferior iliac spine; the groove for the psoas and iliac muscles; the ileo-pectineal eminence, for the insertion of the lesser psoas; a triangular surface, smooth, inclined forwards, and concealed by the pectinalis muscle; the crest; then the spine of the pubis; and lastly, the angle of the pubis.

On its *posterior edge*, in proceeding from above downwards, is seen the posterior superior spine of the ilium; a small irregular notch; the postero-inferior spine of the ilium; which articulates with the sacrum; the great ischiatic notch; the ischiatic spine; the small ischiatic notch, and the most posterior portion of the tuberosity of the ischium.

At birth, the coxal bone is composed of three distinct pieces: one superior, the *ilium*, which constitutes the hip and the two iliac fossæ; one inferior, the *ischium*, which supports the weight of the body when seated; the third, anterior, the pubis, to which are appended, as it were, the organs of generation. It is in the cotyloid cavity, at the ileo-pectineal eminence, and in the middle of the ischio-pubic ramus, that these three bones at length are blended into one about the period of puberty; but there are commonly added, in childhood, a plate for the crest of the ilium, one for the tuberosity of the ischium, another point of ossification for the antero-inferior spine, and a fourth for the spine of the pubis; which sometimes do not coalesce with the principal pieces until a very late period.

ART. II.—OF THE ARTICULATIONS, OR SYMPHYSES OF THE PELVIS.

There are five principal articulations of the pelvis; one for the two pubes in front, two for the bones of the ilium and sacrum behind, that of the coccyx with the sacrum, and that of the sacrum with the spine.

§ 1. SYMPHYSIS PUBIS.

At the *anterior* or median *symphysis*, the bones are kept in contact by a fibro-cartilaginous substance called the interpubal ligament, whose thickness is far from being uniform at every point of the kind of ring or oval circle which it represents. Its thickness, which is very considerable on the upper part, a little less so in front, and much less so behind, becomes suddenly much greater below, where the fibrous body assumes the name of subpubal or triangular ligament. In the centre, the articular surfaces are separated by a very thin plate of cartilage, which in early life, and even in a good many adult women, is moistened by a small quantity of synovial fluid.

A portion of the periosteum lines the posterior surface, a fibrous lamina of the same material is observed in front, and these two layers have received the names of anterior and posterior ligaments of the symphysis pubis.

Adopting the opinion of Hunter, Dr. Burns believes that there is at first a cartilage on each bone of the pubis, and that afterwards a fibro-articular layer is interposed between them; but this is not really the case, for in proportion to the age does the breadth of the prismatic and fibrous circle of the articulation cause the cartilaginous surface to present inverse dimensions, and very frequently to end by disappearing from the circumference to the centre. Anchylosis of the pubis, observed by Desgranges, Burns, and myself, becomes in this manner a natural phenomenon among some women; but Hunter, however, seems to question it.

§ 2. SACRO-ILIAC SYMPHYSES.

The *sacro-iliac* or posterior *symphyse*s are much more complex than the preceding. There the sacrum is locked, like a double wedge, between the coxal bones, so that it offers a very efficient resistance to the weight of the body, which presses it from above downwards, and to the efforts of the pelvic viscera, which tend to force it backwards; its articular surfaces, although uneven, are nevertheless covered with a very thick diarthrodial cartilage, while those of the iliac bones are wholly destitute of them. Authors are therefore wrong in according to them a lamina, and in remarking that it is much thinner than on the sacrum.

The name of posterior sacro-iliac ligament is given to a collection of fibrous bundles, that are yellow, elastic, mixed with small lumps of fat which fill up the uneven and rugose excavation that is seen behind the cartilaginous surfaces. These fibrous bundles of the same nature with the yellow ligaments of the vertebræ, are composed of fibres decussating in every direction, and are united almost intimately with the sacrum and coxal bones. Being of considerable strength, they give an extraordinary solidity to the articulation which they concur in forming. There is not, rigorously speaking, any anterior sacro-iliac ligament: a simple lamella of the pelvic periosteum serves in its stead.

Other small fibrous bands also serve, but less immediately, to unite the bones of the pelvis behind. These are the sacro-sciatic and sacro-spinal ligaments; which, by passing from the posterior spines of the ilium, and from the inferior half of the edge of the sacrum to the spine, and tuberosity of the ischium, convert the two ischiatic notches into holes.

The connections of the pelvis with the vertebral column and with the coccyx are effected by two amphiarthroses.

§ 3. SACRO-COCYGEAL SYMPHYSES.

One, the *sacro-coccygeal articulation*, is composed, 1. Of an elliptical fibro-cartilaginous lamina, which unites the point of the sacrum to the base of the coccyx; 2. Of the posterior sacro-coccygeal ligament, a sort of prolongation or extension of the supra-spinal ligament of the vertebræ, which closes the lower extremity of the sacral canal; and 3. Of the anterior sacro-coccygeal ligament, formed of two lateral bands united at their point on the front of the second or third piece of the coccyx. I have satisfied myself on the dead body, and also on the living, in the case of a woman, who, by lying a length of time on her back, had this part exposed so that at the centre of the articulation the bony surfaces were encrusted with a true diarthrodial cartilage. From this we can understand how so many diseases may here take their rise, and why such violent pains were observed after labor by Dewees, who, in such cases, is said to have been very partial to large doses of camphor and opium, or oil of juniper. Naturally very movable in women, although Hamilton denies it, this articulation permits the coccyx to turn backwards, from half an inch to an inch, while the child is passing through the lower strait. Deventer is so satisfied of the advantages of the backward movement, that, to accomplish it, he introduces the whole hand into the vagina. Its great rigidity renders labor difficult, and may, if we can place confidence in Sennert, cause the death of both mother and child. Amand, with less exaggeration, imputes to this rigidity the sharp pains which some women sometimes feel about their anus after confinement. In maintaining that the escape of the foetus would be impossible without the turning back of the coccyx, Mauriceau and Peu probably had in view those cases where it is strongly inclined forward. Otherwise De la Motte, in his opposition to them, would have been perfectly justified in maintaining that this bone seldom offers any great obstacle to delivery. I may say the same of Burton, who laughs at the practice of Deventer, and very justly remarks that the obstacle to delivery does not exist there. The consolidation of the coccyx with the sacrum frequently occurs in women who become pregnant very late in life.

Smellie met with it in a patient thirty-three years of age ; and I have observed it in two women who died, one at the age of thirty-one years, and the other at thirty-seven, without having had children. Its great mobility in other women renders its luxation possible in time of labor, as Lauverjat, who says he has once successfully reduced it, proves, contrary to the opinion of Pineau, Chapuis, and Louis, who deny its possibility. If it be ankylosed, Denman maintains that the head of the foetus is able to push it back with a snap.

§ 4. PROMONTORY.

The other, the *sacro-vertebral articulation*, differs from the vertebral amphiarthroses only in the thickness of its fibro-cartilage ; in the obliquity of the articular faces of the last lumbar vertebra, and of the sacrum, an obliquity which produces the sacro-vertebral angle, or the *promontory* ; and by the presence of the ilio-lumbar ligament, which extends from the last transverse vertebral apophysis to the posterior extremity, and not to the posterior spine of the iliac crest, as is incorrectly asserted by several modern authors. Simmons, who falls into this error, evidently confounds the iliac ligaments, which he calls the sacro-iliac or lateral, with the fibrous expansion seen on the outside of each lesser ring of the sacrum.

The *obturator membrane*, and the ligament of Fallopius, which extends from the anterior superior spine of the ilium to the spine of the pubis, constituting the crural arch, and separating, before it terminates, into two columns to form the inguinal ring, completes the ligamentous apparatus of the pelvis.

ART. III.—OF THE PELVIS IN GENERAL.

§ 1. EXTERNAL SURFACE.

The principal use of the external surface of the pelvis, which is very uneven, is to give attachment to the muscles which surround the coxo-femoral articulation ; it may be divided into four regions.

The first, *anterior*, bounded on the sides by the cotyloid cavities, presents, in its middle, the front of the symphysis of the pubis, and laterally, the external obturator fossa, filled with the corresponding muscle.

The second, *posterior*, bounded by the projection of the coxal bones, is formed almost wholly by the posterior surfaces of the sacrum and coccyx. Consequently, we may observe in this region the sacral crista and the lower orifice of the spinal canal ; the sacral portion of the vertebral grooves filled with the point of the sacro-spinal muscle, and in the bottom of which are seen the ten posterior sacral holes, from whence pass the nerves of the same name.

The two last, *lateral*, enclosed by the preceding, present the external iliac fossæ above ; below and behind, the posterior surface of the sacro-ischiatic ligaments, and the plane of the notches or holes of the same name ; below and forwards, the cotyloid cavity which receives the head of the femur.

§ 2. INTERNAL SURFACE.

Some authors, as Deventer, Burton, &c., have compared the pelvis to a barber's basin. Although trivial, this comparison, nevertheless, gives a pretty exact idea of it. We may, with the moderns, divide its internal portion into two parts : one, *superior*, which bears the name of *greater basin*, *upper basin*, or *abdominal basin*, on account of its dimensions, its situation, or the parts it encloses ; the other, *inferior*, and which is also known as the *lesser basin*, or the *pelvic excavation*.

The abdominal basin constitutes part of the belly. Of an elliptical form, largely notched in front, where it corresponds to the hypogastrium, notched also behind, in order to receive the lower end of the spine, this cavity is composed of the two internal iliac fossæ, which belong to the coxal bones, as well as to the

lesser wings of the sacrum, and which are occupied by the sigmoid flexure of the colon on the left, the cæcum on the right, and by some folds of the small intestines on both sides.

The *lesser basin* may be considered as part of a canal larger in the middle than at its two extremities, curved anteriorly, and destined to contain the internal genito-urinary organs, the rectum, and the hypogastric and sacral vessels and nerves. In order to obtain a clearer idea of it, it is well to follow the advice of M. Chaussier, that is to say, to remove the greater basin by a horizontal section with a saw. Like the external surface, it may be divided into four regions, and circumscribed in the same way, always excepting the lateral regions, which leave the internal face of the ilium above them.

The *anterior* region of the lesser basin, very greatly notched below by the pubic arch, slightly convex from above downwards, and concave transversely, comprises the posterior face or the bodies of the pubes, of the ischio-pubal rami, and of the obturator membranes. We may remark, 1. On the median line a perpendicular crest, more or less salient, formed by the posterior part of the symphysis pubis; 2. Outwardly, the internal obturator fossa, surmounted by a canal (and not a simple hole), oblique from behind forwards, and from without inwards; through this, which is called the sub-pubal or obturator canal, the obturator vessels and nerves proceed from the interior of the pelvis to the inner side of the thigh.

The *posterior* region, very much excavated, is represented by the anterior surface of the sacrum, of the coccyx, and of the root of the sacro-ischiatic ligaments.

The *lateral* regions, formed in front by the internal face of the cotyloid portion and the rest of the ischium, behind by the inner face of the sacro-ischiatic ligaments, are largely opened by the two sciatic holes. Of these two openings, one, superior and the largest, is of an oval shape, and gives passage from within the pelvis, 1. To the pyriform muscle, which is inserted into the great trochanter; 2. To the great sciatic nerve, which proceeds to be distributed on the back part of the thigh, the outer and back part of the leg, and to the whole foot; 3. To the gluteal artery, and to the internal pubic vessels and nerves: the other, inferior, much smaller, of a triangular shape, is filled by the internal obturator muscle, which proceeds to join the tendon of the pyriforme in the digital cavity of the great trochanter, and by the pudic vessels and nerves which re-enter the pelvis to be distributed in the perineum.

Suppose a vertical cut, which should divide the lesser basin into four equal parts, there would be found four planes inclined towards each other at their points. The two anterior inclined planes comprise a portion of the lateral regions and the whole of the anterior region of the excavation; the two posterior are formed by the front of the sacrum and coccyx, by the sciatic ligaments and notches, and the sacro-iliac articulations. It is always on two of these four surfaces that the extremities of the diameters of the foetal head glide, during parturition.

§ 3. STRAITS OF THE PELVIS.

The outlet and entrance of the lesser pelvis are both represented by a sort of circle known in Tokology under the name of straits.

A. *Superior strait*.—The horizontal circle which separates the internal surface of the pelvis into two parts is called the superior or abdominal strait, greater strait, or margin of the pelvis or isthmus; formed behind by the sacro-vertebral angle—which Plenck calls promontory—and the anterior edge of the lesser wings of the sacrum, outwardly by the rim which limits the iliac fossa below, and in front by the superior posterior edge of the body of the pubis; it is thick or rounded in the first portion described, while in the second, on the contrary, it grows thin, and is transformed, so to speak, into a crest.

Its form in the dried pelvis approaches more or less to that of an oval, of the

heart on a card, or of an ellipse; but with the soft parts it represents a triangle, with the base in front.

The *inclination* of its axis has occupied the attention of accoucheurs not a little for a century. This inclination is less in the sitting posture, and when the person lies down or bends forwards; it increases in pregnant women; in those who make use of their abdomen to support heavy burdens, as is the case at Paris with the women who sell fruit, vegetables, fish, &c.; also while on the knees, and whenever, for the purpose of preserving the equilibrium, we attempt to throw the upper end of the central line of the body backwards. However, there is such variation in this respect that observers seldom arrive at the same results. Levret, for example, one of the first to draw attention to its importance, reduces to thirty-five degrees the angle which separates the plane of the superior strait, from a horizontal plane extending from the superior edge of the pubis to the anterior face of the sacrum; whilst Muller and Smellie give to it forty-five degrees in place of fifty-five degrees, first advanced by Bang (1774), and afterwards by Carus (1820); Osiander allows only thirty. If M. Boetschler gives confidence to the assertion of Muller, by his endorsement of the experiments of M. Cluge, we on the other hand see Nægele, who has examined more than eight hundred women, rather inclining to the opinion of Bang, since his mean range is from fifty-nine to sixty degrees. I shall again refer to this under the article *excavation*, when we will see that this difference in opinion is much more apparent than real.

Its *axis* is an imaginary line extending from the umbilical region to the lower two-thirds of the front of the sacrum. Although he does not name it, Deventer points it out very clearly. The line of the pelvis, says he, runs obliquely upwards, as if we would include the navel in it. Muller was the first, according to Nægele, to name and point out its inclinations. Every degree of inclination of which the plane of the strait is susceptible is equally applicable to its axis, since the latter must pass through the former. The upper extremity of this may rise higher or fall lower, according as its lower extremity recedes from or approaches towards the point of the coccyx. In this respect there are infinite shades of difference, which must not be lost sight of in practice, whether the labor be terminated spontaneously, or whether the child must be turned, sought for by the hand, or delivered with instruments. According to Lobstein, seventeen degrees of inclination is too near, and fifty-five too far from, the vertebral line for the deliveries to take place without assistance. But M. Nægele mentions the case of a lady in whom this axis was parallel to the horizon, and another woman in whom it was vertical, although the delivery took place in both spontaneously. The study of deformities of the pelvis will call us again to this subject in another place. I shall merely observe that, in early youth, the inclination of the axis in question is also very great, in consequence of the depression of the pubes, and that Camper was mistaken in saying that at that period it is almost parallel with the spine.

Its principal *diameters* are four in number: the *sacro-pubal*, or *antero-posterior*, which extends from the most salient point of the sacro-vertebral angle to the posterior surface of the symphysis pubis; the *transverse* or *bis-iliac*, which passes from the lower edge of one iliac fossa to a point diametrically opposite; the two *oblique* or mean diameters, which proceed from the sacro-iliac symphysis, and terminate behind the ileo-pectineal eminence of the opposite side.

Deventer and De la Motte have not as yet had recourse to any geometrical measurements for determining either the form or dimensions of the pelvis. We are indebted to Ould and Levret for the introduction of the term *diameter* into the field of obstetrical science. It was thought, at first, with Smellie, that it was sufficient to point out the sacro-pubal and basilic diameters; but it was very soon seen that the third or oblique was no less important, and Levret hastened to introduce it in the next edition of his work. The angle of the sacrum, that projection formed, according to Deleurye, for assisting the rotation of the child, renders it

necessary to establish a subdivision of the latter. In fact, the line extending from the cotyloid cavity to the promontory has, perhaps, a still greater influence than the oblique diameter itself, on the head of the fœtus during delivery; it is proper then to add another diameter to the three already known. I am astonished that no person ever thought of it before, for we shall perceive, from what follows, that it must perform an important part both in theory and in practice. I shall call it *sacro-cotyloid*, and it is scarcely necessary to say that there is one on each side.

The length of the first or small diameter is, according to Chaussier and most of the French authors, four inches, and according to Meckel four inches and four lines; that of the second is five inches; that of the third from four inches and four lines to four inches and a half: so that their union gives a circumference of about thirteen inches and a half, and not the fourth part of the height of the individual, as advanced by Levret, nor a circumference of sixteen inches, as laid down by Pitois; for we see Burton giving five and a half inches to the transverse diameter, which has but five and a quarter according to Barbaut, Smellie, and Deleurye—and these same authors themselves granting four inches and a quarter to the *sacro-pubic*, whilst in our time we find it to have only four inches. But these dimensions are subject to great variety, and ought not to be understood here except in a very general manner. The measurements I have taken of a great number of pelves have given me, on an average, four inches and three lines, five inches, four inches and a half, and three inches and eight or ten lines for the *sacro-cotyloid* diameter. I can, therefore, no more explain how Mr. Burns can give five inches and a half to six inches for the transverse, and five inches to five inches and a half for the oblique, than how Aitken can give four inches and six-eighths for the antero-posterior diameter.

B. Inferior strait.—The *inferior* strait, lesser strait, perineal strait, or apex of the pelvis, is formed by the point and edges of the coccyx, the edges of the *sacro-sciatic* ligaments, of the tuberosities of the ischium, and the *ischio-pubal* rami; it accordingly presents three triangular projections, the coccyx behind, and the two ischia on the sides; as well as three indentations, one anterior, very deep, known as the arch of the pubis, and two others, posterior, still deeper and very irregular when the *sciatic* ligaments are removed, but, on the contrary, quite superficial when these fibrous bands are in their natural situation. Its form is precisely like that of the heart on a playing-card; only it may become oval by the retreat backwards or the removal of the coccygeal triangle; it being in the mean while understood that the widest, most open part of these figures is always turned backwards.

Like the abdominal strait, the inferior strait has four diameters: one, the *coccy-pubal*, or antero-posterior, is measured from the point of the coccyx to the top of the arch of the pubis; another, the transverse, or *bis-ischiatic*, from the posterior and interior part of one tuberosity of the ischium to that of the opposite side; the two last, or the *oblique* diameters, reach from the point where the rami of the pubes and the ischia meet, to the middle of the edge of the *sacro-sciatic* ligaments. One which might be drawn from the point of the coccyx to the edge of the pubal arch would be of no use unless in case of ankylosis or deformed pelvis; consequently, I do not think it necessary to say anything about it.

These diameters are generally found to be four inches each; however, M. Meckel gives to the first four inches and four lines, and four inches six lines to the second. Deleurye, with Smellie and Barbaut, on the contrary, maintain that they have four inches and a quarter *each*. M. Delpech is surely incorrect in giving as the mean term four inches and a half to one, and five inches to the other. The mobility of the coccyx, and the elasticity of the *sciatic* ligaments, render the antero-posterior diameter capable of being prolonged four, six, eight, or even twelve lines, while the oblique diameters are also evidently capable of being elongated;

PLATE I.

FIGURES OF THE PELVIS.

FIG. 1.—THE DRIED PELVIS WITH ITS LIGAMENTS.

- a, a.* The iliac fossæ.
- b, b.* The iliac crests.
- c, c.* The anterior superior spinous processes of the ilium.
- d, d.* The anterior inferior spinous processes of the ilium.
- e, e.* Poupart's ligaments.
- f, f.* Cotyloid cavities.
- g, g.* The ischia.
- h, h.* Obturator foramina.
- i, i.* The pectineal protuberances.
- j.* The ischio-pubic ramus.
- k.* The symphysis pubis.
- l, l.* The bis-ischiatic diameter.
- m, m.* The sacro-iliac symphysis.
- n, n, n, n.* The false vertebræ of the sacrum.
- o.* The last lumbar vertebra.
- p, p, p, p.* The sacro-sciatic ligaments.
- q, q.* The great sciatic opening.

FIG. 2.—THE SAME PELVIS SEEN FROM ABOVE.

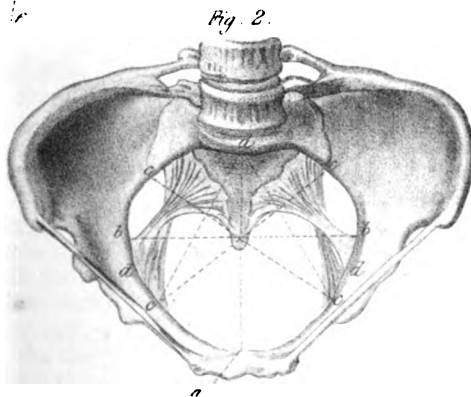
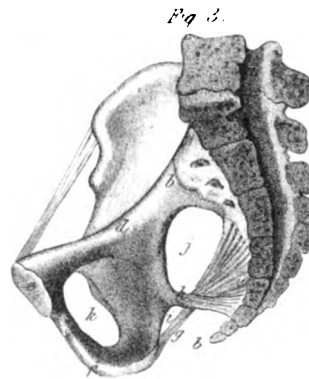
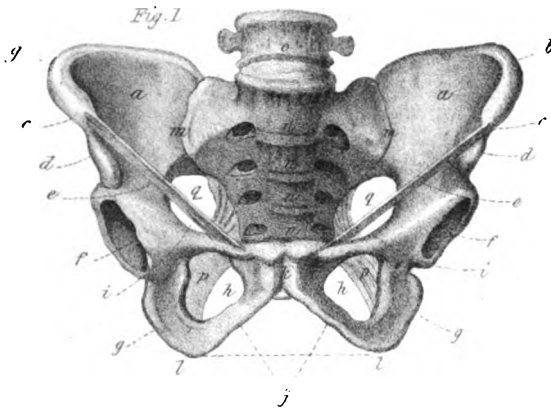
- a.* The antero-posterior diameter.
- b.* The transverse diameter.
- c, c, c, c.* The oblique diameters.
- d, d, d, d.* The sacro-acetabular diameters.

FIG. 3.—VERTICAL SECTION OF THE PELVIS.

- a.* The sacral canal.
- b.* The point of the coccyx.
- c.* The articular surface of the pubis.
- d.* The side of the superior strait.
- e.* The internal surface of the ischium.
- f.* The tuberosity of the ischium.
- g.* The greater sciatic ligament.
- h.* The lesser sciatic ligament.
- i.* The lesser ischiatic foramen.
- j.* The greater ischiatic foramen.
- k.* The obturator foramen.

FIG. 4.—THE DIRECTION OF THE AXES.

- a, a.* The sacro-pubic diameter.
- b, b.* The coccy-pubic diameter.
- c, c.* The axis of the superior strait.
- d, d, d.* The axis which the head of the child should follow, or that of the pelvis.
- e, e, e, e, e.* Lines perpendicular to the different portions of the anterior surface of the sacrum.
- f.* The axis of the coccy-pubic diameter, or of the inferior strait.



the transverse, on the contrary, I have always found to be a few lines less than four inches. Taking this view of it, I am inclined to the opinion of Aitken, inasmuch as the mean of four well-formed pelves furnished him with four inches and one-eighth antero-posteriorly, and three inches and six-eighths transversely. Thus the circumference of the perineal strait should be twelve to thirteen inches.

In general, the plane of the inferior strait is inclined slightly upwards, so that the line that represents it crosses that of the superior strait in front of the symphysis pubis; however, it is sometimes found to be horizontal, and even below the level of the coccyx. The inclination of this plane, which, according to Röederer and Carus, is eighteen degrees, in the opinion of Bang is only three degrees and a half, deducting the coccyx. M. Nægèle, after examining five hundred women, and finding that the level of the coccyx was four hundred and fifty-four times above, twenty-six times below, and twenty times of the same elevation as the summit of the arch, thought he could prove that the point of this bone is from seven to eight lines higher than the arch, and that the plane of the strait would be rather inclined downwards than upwards. But we will see further in what these differences consist, and that the real plane of the strait which the head traverses in passing out is almost parallel to the axis of the strait instead of tending downwards.

The axis of the inferior strait is represented by a straight line drawn from the interior of the pelvis, and cutting the middle of the coccy-pubal diameter at right angles; the upper extremity of this line most commonly rises as high as the sacro-vertebral angle, and sometimes is found to be even parallel with the spinal column, and may approach even nearer to the axis of the superior strait in very many instances, as is proved by the late researches of Professor Nægèle, and as I have ascertained for myself on the dried pelvis of some women, who during life held themselves very erect. The fact is, a horizontal line of the superior strait, reaching backwards from three inches and eight to ten lines below the promontory, as the professor of Heidelberg insists, giving sixty degrees of inclination to its plane, causes the axis of the superior strait to approach very nearly the perpendicular, and not to incline five degrees, for example, as in the system of Stein.

In order to obtain correct notions on this subject, it is necessary to suppose the coccyx depressed, as it is by the head of the fœtus at the moment of delivery; the posterior extremity of the coccy-pubal diameter will then be found lower than its anterior extremity; and the axis of the strait descends obliquely from behind forwards, under an angle of from fifteen to twenty degrees, passing from the anterior face of the first or second piece of the sacrum, through the middle of the space which separates the anterior parts of the tuberosities of the ischia. This axis then crosses, at the centre of the excavation, that of the superior strait, as is the opinion of Levret, without the point of intersection ever allowing them to become confounded, as has been stated by Guillemot. A distended perineum, by lengthening out the coccyx or posterior wall of the pelvis, causes on the other hand the circle which is about to give passage to the fœtus to be nearly on the same plane with the anterior face of the symphysis pubis, and its axis to be parallel with the plane of the superior strait.

From this it is evident that the inclination of the two straits will be always about two inches and a half, the whole difference in length, in fact, that the posterior wall of the pelvis has over the anterior, and invariably in inverse ratio with each other, unless the sacro-coccygeal curvature is increased; for the pubis cannot descend horizontally unless the coccyx rises or appears to rise as much. Now, as it is from this especially that we are enabled to draw any practical application, I think that, without neglecting the results furnished by the pelvis prepared or covered with the soft parts, except at the time of labor, it is still more important to examine it closely in the point of view just referred to.

§ 4. DIMENSIONS OF THE EXCAVATION.

The anterior wall of the pelvic cavity, opposite to the symphysis of the pubis, is only eighteen lines high; but more outwardly it is near three inches: the depth of the middle portion of the lateral regions is at least three inches and a half; the posterior wall is at least five along the median line, following the curve of the sacrum; and only four in a straight line, from the promontory to the point of the coccyx. From these differences it is manifest that the inclination of the straits will always be about two inches and a half, and in an inverse proportion, in each case; for the pubis cannot be depressed towards the horizon without an equal or apparent degree of elevation of the coccyx.

The sacro-pubal diameter is increased, by descending to the centre of the excavation, from six to ten lines, on account of the concavity of the sacrum; the transverse diameter, on the contrary, diminishes gradually as it approaches the bis-ischiatric, where it is only four inches. The oblique diameters alter but very little, and I am ignorant of the facts that might warrant M. Meckel in assigning to them a length of five inches and four lines. It therefore follows, that all the diameters are nearly equal at the centre of the pelvic cavity, and present from four inches and a quarter to four and three-quarters each. As it is in this part of the pelvis that the head performs most of its movements, we must admit, with Flamant and Guillemot, that the diameters of the excavation require as much attention as those of the straits, excepting that it does not seem necessary to include among them the sacro-cotyloid.

As the anterior face of the sacrum presents us with a cavity that is irregular and of greater or less depth, it is easy to understand that a series of right lines that should fall perpendicularly upon it could not be parallel; that they would all converge towards each other, and cross at angles more or less acute in front of the articulation of the pubis, with the exception of one that would be exactly horizontal.

Every right line above this inclines downwards in proportion as its base approaches the sacro-vertebral angle; all those on the contrary incline upwards the more they approach the coccyx. If the curvature of the sacrum were regular from the base to the summit, we might even show the degree of inclination or elevation of these different lines, which are of so many planes of the pelvis; but it is not so. Generally the sacrum is almost straight to the extent of two or three inches superiorly; its third or inferior half alone is curved, so as to form an arc of a circle; but an arc of a circle extended through the coccyx or perineum, distended or not, would almost invariably be confounded with the axis of the symphysis pubis. Now, as the coccyx and the perineum do not yield to the same extent in all women, we at once perceive how the inclination of the inferior strait may offer varieties in the same women, and how a number of authors may arrive at different results on this point.

For the same reason, we may imagine that the plane represented by each of these lines must have an axis as well as those of the straits, and consequently, that we cannot refuse to admit an axis of the excavation. The union of all these axes would give a curve, concave anteriorly, and whose two extremes would be represented by the central lines of the superior and inferior straits.

By viewing the axis of the pelvis in this light, the accoucheur will always have before him the direction of the plane of the anterior face of the sacrum; of the coccyx, and even of the perineum; and as this is the plane that directs the head of the fœtus, such a mode of regarding it seems to me more simple, and much more useful for practice, than the method indicated by certain authors, and which is burdened with geometrical formulas.* This axis is, therefore, neither a straight

* *Vide Deventer (Observ. sur le Manuel des Accouchemens, 1734)*, who appears to have been the first to indicate that the cavity of the pelvis is not parallel to the axis of the body; Müller (*Collect. de Haller*); Ræderer (*De axis pelvis, &c.*, Gott. 1751); Smellie (*Treatise on the Theory, &c.*, 1771); Levret (*Art des Accouchemens, 1766*); Camper (*Translation of Mauriceau, 1759*);

line placed at the centre of the excavation in front of the point of intersection of the other two, as Saxtorph, Stein, and a number of modern authors have thought, nor a part of a circle, as the language or drawings of Camper, and the term *directing axis*, proposed by M. Choulant, would lead us to suppose. At first it is parallel with that of the superior strait; opposite the third false vertebra, it is slightly curved, and, finally, as it approaches the coccyx, is very much bent so as to become almost horizontal on reaching the vulva. Only when the projections of the ischia offer more resistance than the soft parts is the true plane of the strait definitely represented by that of the whole pubal arch extended in the line of its point of departure backwards and downwards; so that the terminal and practical axis of the pelvis is within a few degrees, as I said above, of the same line as the plane of the superior strait. Stein, calculating from the articulating surface of the sacrum, found forty-nine degrees for the superior, and five degrees and a third for the inferior strait. Baker, making a vertical section of the pelvis, and drawing a straight line from the front of the lumbar vertebrae, necessarily arrived at different results. M. Boetschler having placed the point of his compass on the apophysis of the fourth lumbar, instead of applying it to the first bone of the sacrum, as others had done, could not agree with his predecessors. Finally, a plane extending from the top of the arch to the coccyx, with a plumb line at its centre, also leads M. Nægèle to different conclusions, although it does not interfere with the views entertained by Rœderer and Levret. It is on the prepared pelvis really, and by its interior surface alone, that we can be of one opinion on such a matter. Exteriorly, or on a living woman, there are too many causes for mistake, to arrive at anything definite. Let us take, for example, the plane of the superior strait; its natural direction carries it backwards and upwards, not only on a level with the spine of the fourth lumbar vertebra, as M. Boetschler has said, instead of falling on the first tuberosity of the sacrum, but even as far as the third. And then how are we to distinguish these tuberosities through the integuments with any degree of precision?

As regards Müller, it is as difficult to follow him as Ould through the midst of his geometrical ratiocinations and conic sections. The drawing given by Carus, on the other hand, shows the absolute necessity, before examining the opinion of the author, of at first having an exact idea of the way in which he proceeds. This last writer, in fact, by using a sacrum regularly curved, and by drawing a line horizontal to the middle of the excavation, could not agree with those who draw this line on a level with the straits.

We might, moreover, in my opinion, sum up all that it is important to know in this chapter, by uniting the inclination of the superior and inferior planes, and by saying that this inclination is on the whole about sixty degrees previous to labor, whilst, during the escape of the fœtus, it may elevate itself almost to a right angle.

§ 5. BASE OF THE PELVIS.

The great circumference or base of the pelvis looks upwards and forwards. Its plane is parallel to that of the abdominal strait. It is formed posteriorly by a notch, in the bottom of which is seen the base of the sacrum, and which is naturally filled by the last vertebra, the ileo-lumbar ligaments, and the quadratus lumborum muscles; outwardly, by the superior edge of the coxal bone, which affords attachment to the three broad muscles of the abdomen—that is to say, to the external oblique by its outer lip, to the transversalis by its inner lip, and to the internal oblique by its interstice; in front by the great hypogastric notch which looks from above downwards, and from without inwards; by the antero-

Stein (*Art d'Accoucher*, 1804); Lobstein (*Bulletin de la Faculté de Médecine de Paris*, 1815); Flammant (*Thèse de M. Guillemot*, Paris, 1824, No. 164); Baker's Drawing; and especially the learned Memoir of M. Nægèle (*Das Weibliche Becken*, &c., Carlsruhe, 1825, and in *Archives de Médecine*, June, 1827).

superior spine of the ilium, to which are attached Poupart's ligament, the sartorius muscle, and a part of the iliac muscle and the fascia lata; a small semilunar depression for the passage of some nervous filaments going to the thigh; the antero-inferior spine of the ilium, which gives insertion to one of the roots of the rectus femoris muscle; a second depression for the passage of the united psoas and iliacus muscles; the linea ileo-pectinea, sometimes scarcely discernible, and sometimes very salient, and which receives the attachment of the psoas parvus; a third depression or triangular space filled up by the origin of the pectineus muscle, and corresponding to the crural vessel and nerves; the pectineal crista or postero-superior edge of the pubis, oblique from without inwards, which forms part of the superior strait, and terminates in the spine of the pubis, to which are attached the outer pillar of the abdominal ring and the rectus abdominis muscle; lastly, by the upper edge of the symphysis pubis.

§ 6. OF THE DIMENSIONS OF THE PELVIS, UNCONNECTED WITH ITS AXIS OR STRAITS.

The space comprised between the two anterior inferior spines of the ilia measures eight, and not nine inches; that between the antero-superior, nine, and not ten; ten, and not eleven, between the middle portions of the cristæ of the ilia, as Chaussier would establish. The length of the crest of the ilium, following its course from the postero-superior spine to the antero-superior tuberosity, is eight inches, and six inches in a straight line. We see, then, that the separation and length of iliac crests give twice the extent of the corresponding diameter. The base of the sacrum is four inches across, and two inches and a half from front to rear. From the middle of the iliac crista to the tuberosity of the ischium is seven inches, and the margin of the excavation cuts this line into two nearly equal portions; the symphysis pubis, which is eighteen lines high, is only half an inch thick. The arch of the same name is from three and a half to four inches wide at its base where it blends with the bis-ischiatic diameter, and only ten or twelve lines at its apex; its height is two inches and a half; and the bony semicircle of which it is composed is folded forwards and outwards, as if it had been turned in this way by the passage of some hard and rounded body, while still in a soft and plastic state.

§ 7. DIFFERENCES OF THE PELVIS, IN RESPECT TO AGE, SEX, AND SPECIES.

At birth, the pelvis is extremely narrow and very much elongated; the curves of the iliac crista are scarcely begun, and the position of the ilium is almost vertical; the pelvic cavity is conoidal and not excavated; the sacrum is so much elevated that a horizontal line passes under the point of the coccyx at the same time that it rests on the top of the pubis; its transverse are much shorter than its antero-posterior diameters. Nevertheless, it would be incorrect to think, with Camper, that in early youth the axis of the superior strait is almost parallel with the vertebral column. The bones are still bordered with thick layers of temporary cartilages, and the whole is so compressible that the dimensions of the pelvic extremity of the fœtus may easily accommodate themselves to those of the maternal pelvis during labor. After two or three years, some new osseous points are produced, but they do not always coalesce entirely with the rest of the coxal bone until the age of fifteen or twenty years. The spine of the pubis has even been seen to acquire a length of six or eight lines, and remain movable like an independent piece, which has caused it to be compared to the marsupial bones of the didelphic animals.

It is, therefore, not until the fifteenth or eighteenth year that the evolution and union of the several osseous points of the pelvis are entirely completed; so that previously to this age it is not the height of prudence to expose a woman to become pregnant.

In men, the pelvis always retains, in respect to its form, the same characters it had in infancy. All its parts are narrower and deeper than they are in women; the coccy-pubal diameter is only three inches and a quarter, the bis-ischiatic three inches, and the bis-iliac four and a half. There are only seven or eight inches between the antero-superior spinous processes, and eight or nine from the middle of one iliac crista to the opposite one. The arch of the pubis is straight, not wide in front, and almost triangular; the symphysis of these bones is at least two inches long, and the thyroid foramen approaches also to the form of a triangle. The sacrum, according to most writers less curved, is perhaps, on the whole, more so than is maintained by Meckel. The less suddenly it inflects downwards, the more likely is it to be excavated at its base. As a general rule, the excavation is not so deep, the superior strait is more inclined, rounder, and more like an oval or a circle; the iliac fossæ are more hollow, the great trochanters are not so far apart, the bones are in general thicker, and especially more uneven on their outer surfaces; in the male pelvis, everything bespeaks strength and solidity, and is so arranged as to render *progression* easy.

In women, on the contrary, the articulations are not so compact; they are thinner; the iliac cristæ are wider, and turned outwards more than the base of the thorax, which gives a greater breadth to the hips. The trochanters widely separated, by increasing the transverse extent of the base of support of the body, also render walking more difficult, and give to the sex a gait that is altogether peculiar; in a word, nature seems here to have sacrificed strength and ease of motion to the advantage of pregnancy and parturition.

In the male pelvis, the coccyx early unites with the point of the sacrum, and the three symphyses frequently ankylose in old age. In women, the sacro-coccygeal articulation remains movable even until the period of decrepitude; the sacro-iliac and pubic articulations are rarely ankylosed, even at the most advanced age.

In thin women, and in those who are very tall, the pelvis is not so wide, and resembles more nearly that of the male, than in persons of a short and well-proportioned stature; which, in the opinion of the common people, causes the former to bear children with more difficulty than the latter.

The *pelvis of animals* is notably different from that of the human species. If Roussel and some other philosophers had paid attention to this circumstance, they doubtless would not have maintained that labor requires no aid, because brutes are delivered of their young without needing assistance, and almost without pain. In fact, in most quadrupeds, the pelvis, scarcely curved, in reality presents only one single axis; the sacrum is almost parallel with the spine; the straits are only slightly inclined; and the walls of the pelvic canal are nearly all of the same length. The coxal bones are so narrow, straight, and elongated, that there is, so to speak, no iliac fossa; so that delivery is not exposed, in these species, to the same hazards as in man.

It must not be thought, however, that nature changes thus suddenly, and without gradation, the form of organs in a series of creatures. In the monkeys, the pelvis, by differing from that of the inferior animals, is found already to approximate somewhat to the character of the human pelvis. It is only by ascending the zoological scale, that we find it gradually becoming more perfect. Its various shades may be traced in the ourang-outang, the Bosjesmans, who from their organization seem to constitute the connecting link between the monkey and man, in the Ethiopian or Negro, and the Malay or Japanese races, before coming up to the Caucasian race, in which it is removed as far as possible from the form observed in the other mammiferæ. On this subject we may consult the interesting work of Dr. Wrolick, who had in Holland an opportunity of comparing the pelvis of negroes, the Japanese, Bosjesmans, Mestiches, and Europeans, and who, in eight plates attached to his work, very satisfactorily points out the differences between them.

PLATE II.

THE PELVIS WITH ITS APPENDAGES, AND PELVIMETERS.

FIG. 1.—THE PELVIS WITH ITS APPENDAGES.

- a.* A portion of the rectum.
- b.* The womb incised.
- c.* The bladder incised.
- d.* The termination of the aorta.
- e, e.* The primitive iliac arteries.
- f, f.* The external iliac arteries.
- g, g.* The internal iliac arteries.
- h.* The inferior vena cava.
- i, i.* The external iliac veins.
- k, k, k.* The crural nerve.
- l, l.* The psoas muscles.
- m, m, m.* The iliac muscles.
- n.* The sacral vessels and the sacro-vertebral angle.
- o, o, o.* The tensor vaginæ femoris muscles.
- p, p.* The sartorius muscles.
- q, q.* The anterior rectus muscles.
- r, r.* The pectineus muscles.
- s, s.* The adductors.
- t.* The pubis.
- u, u.* The crural vessels.

FIG. 2.—COMPAS D'ÉPAISSEUR.

FIG. 3.—THE PELVIMETER OF CONTOULY.

FIG. 4.—THE PELVIMETER OF MADAME BOUVIN.

Fig. 1.

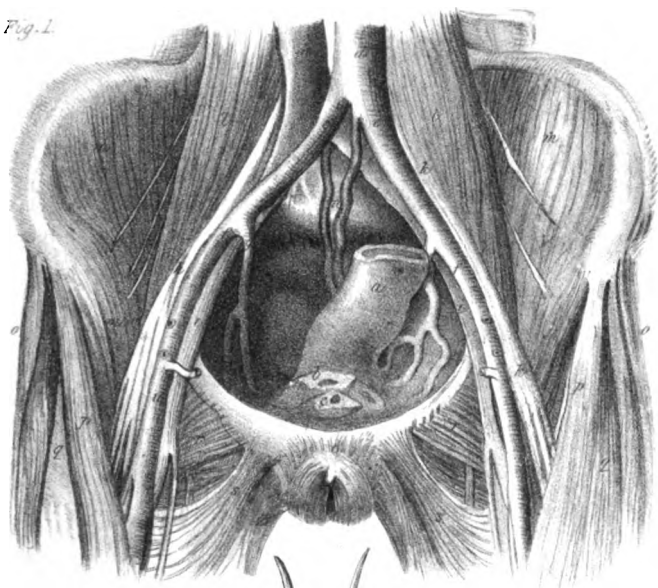


Fig. 2.

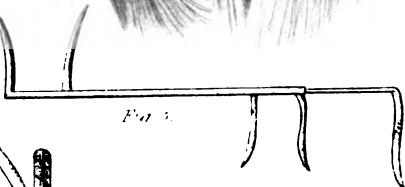


Fig. 3.

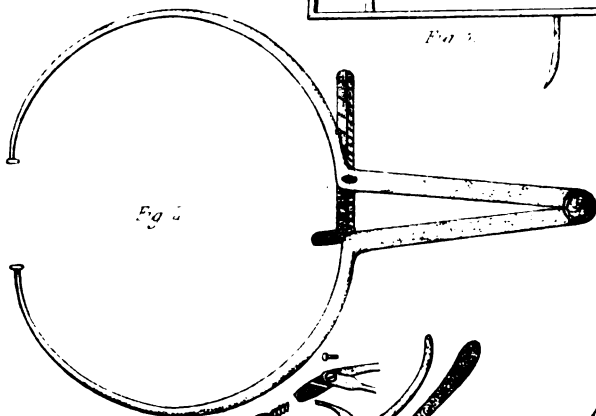
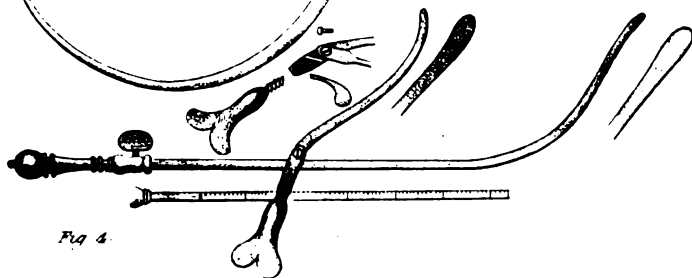


Fig. 4.



See opposite

Hence, we may presume that parturition is so much the more painful as the species is more perfect, and *vice versa*: a compensation as admirable as it is singular, and which occasions dangers in some measure to multiply and accumulate around an animal in proportion as his intelligence becomes more perfect.

In the kangaroo and other marsupial animals, the pelvis is prolonged in front by means of the spines of the pubes, which form two separate bones, and support the pouch, in which the second gestation of these animals is effected. Its narrowness in the cabiai and the mole would not admit of the escape of the young; but, during gestation, the pieces are disjointed, and separate considerably from each other. In the cetaceæ there are only some traces of a pelvis; and in birds, reptiles, and fishes, where it serves only in depositing the egg, we find it gradually decomposed, until it disappears.

SECT. II.—THE PELVIS, AND ITS DEPENDENCIES.

The soft parts which naturally cover the interior of the pelvis, produce certain changes in its form and dimensions, the knowledge of which is indispensable to the accoucheur. I shall, therefore, following the example of M. Guillemot, relate them with some detail.

The psoas and iliac muscles lining the lateral excavations of the greater pelvis form at that part a sort of cushion, very well adapted for lessening the concussion and confusion which the uterus, charged with the product of conception, might experience during standing or walking. In like manner, they afford protection to the crural nerves, and render their compression difficult during labor. By their extension at the side of the spine, the psoas muscles also serve as a *point d'appui* to the uterus, but without preventing the aorta and the vena cava from suffering compression, which necessarily embarrasses the circulation of the lower extremities and pelvis. The hypogastric walls equally merit our attention. The force of the recti muscles, and the arrangement of the aponeuroses, concur in causing the womb to incline more readily to the sides than directly in front. We shall again be under the necessity of referring to this subject when speaking of pregnancy.

ART. I.—THE STRAITS.

§ 1. The *inferior strait* is shut up by a kind of partition, which is called the floor of the pelvis; a partition which diminishes by several lines the height of the excavation, and seems to be the antagonist of the diaphragm, or rather of the abdominal muscles, during the efforts of inspiration, defecation, and the emission of urine, and during parturition.

This floor is composed of two fleshy layers: the one, superior, concave above, is formed by the levator ani and ischio-coccygeal muscles; the other, inferior, concave below, is composed of the sphincter ani, transversus perinei, ischio-cavernosus, and constrictor vaginæ muscles. There are also found the lower hemorrhoidal and the internal pudic vessels and nerves, with fat and cellular tissue in greater or less abundance.

Lastly, it is pierced, as it were, on the median line by the urethra, the vagina, and the termination of the rectum. Its lower face is lined by an aponeurosis which seems to rise from the great sciatic ligament, and the inner lip of the pubic arch, and the strength of which, although very variable, will be found greatest as it is examined nearest to its origin. A portion of the pelvic aponeurosis covers its upper region, and I think, with Camper and Désormeaux, that the disposition of the fibrous laminæ may exert some influence on the promptitude or tardiness of labor, particularly in women who have never had children.

§ 2. The *superior strait* is more elevated in the recent than in the dried skele-

ton, by the entire thickness of the psoas muscles, which, with the iliac vessels, form a sort of column, extending from the sides of the sacro-vertebral angle to the linea ilio-pectinea, so as in a considerable degree to contract the bis-iliac diameter, and also to increase the inclination of the strait very much. Instead of being elliptical, or representing an oval whose large extremity should be turned backwards, this strait is now almost circular, or in the shape of a triangle with the base forwards; the sacro-iliac notches scarcely exist, and the sacro-vertebral angle is much less prominent than is commonly supposed, from the idea formed of it upon inspection of the dried pelvis. Nevertheless, it is well to remark that the transverse diameter is not diminished by the psoas muscles in the same degree in all women. In reniform pelves, it may be increased to an inch on each side, while there is scarcely half an inch in the circular straits, and sometimes it is less. We should also bear in mind that the diminution capable of influencing the direction the head first takes, is not sufficient to constitute a real obstacle to delivery, and that its disappearance is favored by placing the thigh in a state of flexion at the period of labor.

From the researches to which I have devoted myself, and the results of which have been already made known, I find that the entrance of the pelvis is widest between the ileo-pectineal eminences: at this point its transverse diameter is four inches and some lines, while the bis-iliac diameter, properly so called, is only three inches and a half to four inches. Beneath the promontory and the psoas muscles, the transverse diameter is really five inches, and the concavity of the sacrum gives quite as great a length to the antero-posterior diameter.

ART. II.—EXCAVATION.

The *bottom of the excavation* is of a lozenge shape, with angles corresponding on the one hand to the ischiatic spines, and on the other to the middle line of the sacrum and posterior surface of the pubic symphysis. These four angles indicate the place of the union of the four inclined planes, which thus represent four triangles, tending to approach each other at their points.

The sacral vessels and plexus, as well as the pyriform muscle, are found in the posterior triangles: the anterior planes enclose the internal obturator muscles and part of the levator ani. The *pelvic fascia* is exactly applied over all these parts; an abundant layer of cellular tissue, in which are embedded the internal iliac vessels, the hypogastric plexus and arteries—a layer which, by the deposition of fat, sometimes becomes so thick as to diminish the cavity, and thus render labor more difficult—lines the whole, and is separated from the viscera by the intermediate peritoneum.

Thus we perceive, from these remarks, 1st, that at its entrance the pelvis is evidently larger in front than behind, and that the foetal ovoid, in engaging itself, must more frequently present in front and on the side: 2d, that below the psoas muscles, the excavation is oval like the prepared pelvis, so as to accord to it the antero-lateral walls formed by the body of the pubes and the superior portion of the ischium, besides a posterior wall consisting of the front of the sacrum and the sacro-iliac articulations, from whence it follows that at this point of its course the occiput tends rather to incline backwards than forwards: 3d, that on a line with the sciatic notches, and the subpubal fossa, it becomes lozenge-shaped, and favors the rotation of the head and its passage towards the pubic arch; 4th, and lastly, that in place of three inches and a half of depth at the sides, the lesser pelvis presents four to four and a half.

SECT. III.—USES OF THE PELVIS.

The different bony pieces which compose the pelvis are susceptible of only a very slight movement upon each other; notwithstanding the assertions to the con-

trary of Duverney, who was opposed in his opinion by Aitken, this kind of sliding which takes place between the sacrum and coxal bones, as well as between the ossa pubes, in consequence of a fall upon the feet, for example, cannot in any manner be compared to articular motion of whatsoever species.

Those cases of extreme mobility that Peu relates, and those where Deventer saw the ossa ilia rise two inches by sliding upon the sacrum, belong to the pathological condition of the part, and in no way invalidate the rule I have just laid down.

The pelvis is the base of the trunk; it forms a complete ring, the posterior half of which, says Désormeaux, supports the entire weight of the body, while the anterior serves as its abutment, so that the weight of the trunk and thoracic members, transmitted through the vertebral column to the sacrum, expends itself first on the ossa ilia, and next on the pubes, which press against each other with more or less force. Precisely the same idea is expressed by Denman, who compares it to two arches, one of which receives the weight of the body through the base of the sacrum, whilst the other transmits it to the lower extremities through the cotyloid cavities.

To the lateral parts of this circle are attached the pelvic members, which in certain postures, in their turn, support the whole of this burden, whether conjointly or separately. This use of the pelvis, though interesting to the physiologist, is still more so to the accoucheur, for it accounts for the vicious and singular forms that are sometimes assumed by the pelvic cavity, when ossification either proceeds too slowly, or retrogrades. Another use of the pelvis is to enclose and protect the bladder, the rectum, the uterus, the tubes, and ovaries. During pregnancy it supports the womb, and maintains it in a proper attitude. During labor it gives passage to the infant by impressing upon it the most favorable direction, and by affording a *point d'appui* to the soft parts of generation.

CHAPTER II.

OF THE DEFORMED PELVIS.

It would perhaps be more rational not to speak of deformities of the pelvis, until we should come to treat of difficult labor; but the custom of examining them immediately after treating of the natural conformation having prevailed for so long a time, I have not felt myself at liberty to deviate from it. The pelvis is deformed whenever it is sufficiently altered, either in its natural form or dimensions, to render parturition difficult, dangerous, or impossible. In this view, a pelvis may be malformed, although its conformation be regular; and it may have a mal-conformation, although it be not deformed. Nevertheless, these two conditions being almost always united, it has happened that the books have commonly confounded them both together. Saccombe, it is true, desired to see a distinction made between mal-configuration and mal-conformation; but this distinction, being purely grammatical, has not been adopted, and scarcely deserves to be combated.

The direction of the axis and planes of the pelvis, the dimensions of its diameters, and even its form, are doubtless far from being, in all pelvises, exactly similar to those I have mentioned above; but a few lines more or less, an inclination more or less decided, a slight mal-conformation, may not be sufficient to prevent a labor from terminating without danger, and it may be conceived that these deformities, properly so called, must be pretty rare.

All deformity of the pelvis may be referred to its excess of amplitude, its narrowness, or the faulty direction of its axis.

SECT. I.—EXCESS OF AMPLITUDE.

It would seem, at the first glance, that a very large pelvis ought to be rather advantageous than unfavorable in pregnancy and labor; but observation and reason prove that this is not always the case.

During gestation, the womb, being less completely supported, may be upset, either backwards or forwards, so long as its dimensions do not exceed those of the abdominal strait,* and it may incline in any direction after the fourth month.

A large pelvis favors the descent of the womb and the prompt termination of labor, and, consequently, exposes the woman to all those accidents which occasionally follow rapid delivery; that is to say, to inertia, inversion of the uterus, and hemorrhage. It is thus that the head, still confined in the womb, which it drags along, enters the excavation at the commencement of the ninth month, and pushes the uterus outside the vulva at the period of labor, as Levret said he saw in several instances.

I agree, nevertheless, with Madame Lachapelle, that these inconveniences have been exaggerated, that it is generally easy to prevent them, and that the falling of the child, the premature detachment of the placenta, and the rupture of the cord, have, perhaps, never been produced by this cause rather than by some other. The excess of amplitude of the pelvis, however, is by no means unusual. It may exist at both straits and in all the diameters at the same time. Mr. Burns has in his possession a pelvis in which the sacro-pubal diameter is four inches and

* I have seen a retroversion in a young virgin.—M.

three-quarters, the transverse diameter five inches and five-eighths, and the oblique four inches and a half. G. de la Tourette saw a remarkable case of it. The sacro-pubal diameter was five inches and a half, the bis-iliac six and a half, the two diameters of the inferior strait each five inches and a half, and the width between the crests of the ilium twelve inches and a half. This excess of amplitude of the pelvis is most usually found at the inferior strait. These are the only kind of pelvis, according to Bongiovani and Capuron, which admit of delivery by the face or in which the head descends with the occiput behind, and not requiring assistance.

SECT. II.—DEFORMITY FROM WANT OF AMPLITUDE.

ART. I.—ABSOLUTE CONTRACTION.

It has been incorrectly maintained that the pelvis cannot be contracted in one direction without becoming larger in another, and that, consequently, the circumference of its straits never varies. Observation has superabundantly demonstrated that, in a considerable number of women, the pelvis retains, after the age of puberty, most of the characters it had in infancy, and that its form approaches more or less to that of the male; and so far, its absolute capacity remains less than it ought to be in the normal state.

Besides, since it is fully admitted that there may be excessive capacity, I see not why there should be any repugnance to assert that it may also be too small in all its directions at once; however, this general and regular narrowness is pretty rare, and I have not yet learned that it has ever involved the necessity of a serious operation. M. Faurichon-Lavalade, however, says that a woman died from this cause, without being delivered, at the Marseilles Maternité. In this case the diameters were as follows: Sacro-pubal two inches and three-quarters, transverse four and a half, and oblique four inches at the superior strait; the coccy-pubal two inches and a half, the bis-ischiatic two inches and three-quarters, and the oblique at the inferior strait three inches. Luchini, however, has for a length of time maintained the possibility of this very fact. M. Nægele, who has in his possession two pelvis in which there was the loss of an inch in the various diameters, says, as I have myself observed, that the absolute contraction is more frequent than is supposed, and that it is principally met with in women of slender form. It is also very frequently observed in cases of great deformity. Morlann relates a case of rachitis, in which the sacro-pubal diameter was seventeen lines, the distance from the sacrum to the right acetabulum four lines, seven to the left, and two inches and five lines at the coccy-pubal diameter.

ART. II.—RELATIVE CONTRACTION.

It may be said, therefore, that relative or partial smallness is the only kind that involves real danger; it is most commonly met with at the superior strait, less commonly at the perineal strait, and is met with still less frequently in the excavation; it may affect the antero-posterior, transverse or oblique diameters, either taken separately, or several of them conjointly.

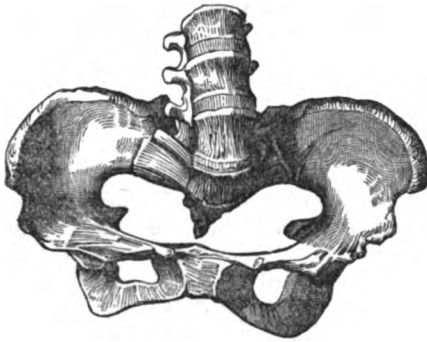
§ 1. ABDOMINAL STRAIT.

According to my researches, I find that it most frequently affects the oblique diameters of the superior strait, and more generally one than both of them at once. Shortening of the transverse diameter is the rarest of all, and has, perhaps, never been met with alone.

These different deformities give to the entrance of the pelvis forms as various as they are easy to conceive of. Shortening of the antero-posterior diameter may depend on too great a saliency of the sacro-vertebral angle, and then the strait is

cordiform or reniform; if, at the same time, the symphysis of the pubis is driven backwards, the pelvis exhibits the appearance of the figure ∞ , lying in a horizontal position. When both of the oblique diameters are affected, the bodies of the pubes, by approaching the promontory, may, if there be no derangement of the symphysis,

Fig. 1.



A pelvis in which the contraction of the sacro-pubic diameter is produced by the unusual projection of the sacro-vertebral angle.

give to the strait the shape of a triangle, a trapezium, or a trefoil, according as the ends of the bis-iliac diameter shall form angles more or less acute or rounded. These pelves, which have been denominated trilobated or trifoliated, also present this peculiarity, that the three segments are sometimes equal, while at other times the anterior portion, or the right, or left, is much smaller than the other two. It may also happen, that the two acetabula may tend to approach each other, in proportion as they approximate towards the sacrum; the pubes in this case, bent at a right angle to the ilio-pectineal eminences, project from one inch

and a half to two inches in front, and become parallel to the antero-posterior diameter, and have between them a space of only a few lines. The figures of two pelves of this sort may be seen in a dissertation by Weideman. Aitken and Madame Boivin have given a design of one that belongs to the same category; but the most extraordinary one is that belonging to M. Jeuffrion, a model of which in plaster was deposited by M. Maygrier in the Museum of the *Ecole de Médecine*. In this pelvis the two pubes proceed directly backwards to the points where they unite with the ilia, that is, to the extent of a full inch and a half; near the acetabula, as well as immediately behind the symphysis, the interval between them is only three lines; all this portion, therefore, is completely foreign to the circle of the strait, and the antero-posterior diameter measures in reality only two inches and a half, instead of five, as would have been supposed had it been measured externally during life.

When only one of the oblique diameters is deformed, it commonly produces a disposition that it is highly important to notice. If, for example, as Smellie has observed, and of which Stein has several drawings, the contraction occurs on the right side, the left may present an excess of amplitude. In this case, it is clear that, if the head presents with the occiput turned to the right, the labor might not come to a conclusion without assistance; whereas, if it had presented to the left, nature would have sufficed for her own relief. This remark indicates, with sufficient clearness, that in order to procure an easy delivery for a woman with such a conformation, it is only necessary to turn, and bring down the child in the first or second position of the feet; so that the occiput may correspond to the largest side of the strait. It also explains why a woman who has been spontaneously delivered of her first child, may not perhaps get through, in a second labor, without symphysiotomy or the Cæsarian section, and *vice versa*.

In 1825, I was requested to attend a woman who had been in labor for two days; the head would not engage; I sought for the feet, and terminated the labor. In 1826, the same woman was brought to the *Hospital de la Faculté*, having been four days in labor. The waters had passed off, and the head was strongly engaged; the womb, being very closely applied to the fœtus, would not allow the operation of turning; the application of the forceps was attempted by MM. Désormeaux,

Deneux, and myself, but nothing could induce the head to descend. This woman, who became pregnant again in 1827, gave me timely notice when her labor came on; I felt for the feet, and everything was promptly and happily terminated. The different issue of these three labors depended upon this, that in one case, the back part of the head presenting to the right, where the pelvis was greatly contracted, could not pass through the strait; while in the other, by turning the occiput to the left, where the natural dimensions were preserved, the passage of the head was not impossible.

Unless the sacrum itself be contracted, it is rarely that a lessening of the transverse diameter of the abdominal strait is capable of interfering with the escape of the child. There are almost always to be found more than four inches between the iliac fossæ, and this kind of deformity only occasions an increase of sacro-pubal diameter, by giving to the strait the form of an oval, or a greatly elongated heart.

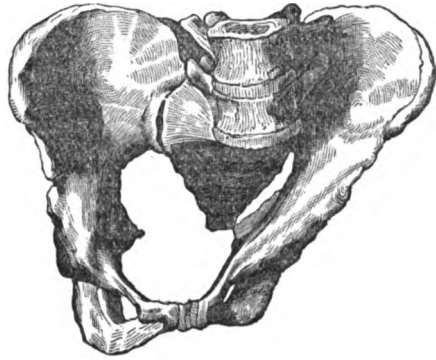
Sometimes the narrowing affects only one side of the pelvis, as is seen in a specimen in the museum of the *Faculté*: in that case, the deformity comprises both the greater and lesser basin.

All these deformities may be combined in various ways, or exist singly, and in very different degrees. Charles Bell tells us that in the pelvis of a woman who had been long affected with osteo-malacia, there remained a space of about three lines only in the antero-posterior diameter, and only about half an inch betwixt the iliac fossæ. In a woman who had already had six children, M. Nægèle saw *mollities ossium* produce so great a deformity of the pelvis, as to have only two lines on the left and six on the right side between the fourth lumbar vertebra and the superior brim of the symphysis pubis. Baudelocque cites a case in which there were only nine lines from the sacrum to the pubis. A contraction almost as great as the one just mentioned is observable in a specimen that I saw in the *Museum de l'Ecole de Médecine*; however, anybody can understand how many shades there may be between these extreme contractions and the normal dimensions of the pelvis. Deventer saw, at London, a pelvis in which the sacro-pubal diameter was scarcely a finger's breadth. Kelly cites one of an inch and a half.

§ 2. PERINEAL STRAIT.

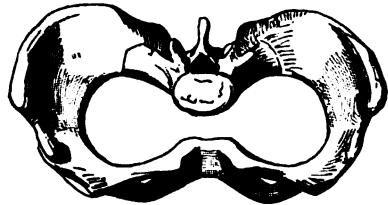
The *inferior strait* is, perhaps, more frequently enlarged than contracted; when the base of the sacrum is depressed towards the pubis, or the pubis driven backwards towards the sacrum, it almost always is in the direction of a see-saw movement, which separates the coccyx more or less from the top of the pubic arch. Although it may be laid down as a general rule that the inferior strait enlarges

Fig. 2.



A figure taken from M. Nægèle's work, which exhibits the characters of the obliquely ovate pelvis in a high degree.

Fig. 3.



The shape of the superior strait in the figure-of-eight pelvis.

while the superior strait contracts, it is, nevertheless, possible that they may both be narrowed at the same time, and that, too, in their corresponding diameters.

The approximation of the tuberosities of the ischia towards each other, too great a straightness, or a triangular form of the pubic arch, coinciding almost always with a *long* symphysis pubis, gives birth to what is called *barrure*, the most common and dangerous of all the deformities of the perineal strait; for, as the foetal head must pass through the pubic arch, rather than behind the ischia where the soft parts arrest it, the *barrure* renders the delivery extremely difficult. The retroversion of the coccyx does no good in this case, and if the child is born at last, it is at the expense of an extensive laceration of the perineum.

The coccyx also very often becomes almost horizontal, and may, by rising upwards, more or less affect the coccy-pubal diameter, especially where the base of the sacrum is thrown back. It also pretty frequently happens that one of the ischia, with its ramus inclines towards the centre of the strait, while the opposite ischium and the coccyx do not alter their position. In fine, the varieties of form are here less numerous than at the superior strait; but the degrees of contraction should be understood in the same manner.

§ 3. EXCAVATION.

Faults of the excavation coincide almost always with the contractions of one or the other strait, and sometimes with both of them simultaneously. They depend either on too great, or on an insufficient curvature of the sacrum, or some osseous projection.

In the former case, the bone is bent, as it were, upon its anterior face, and the sacro-pubal or coccy-pubal diameters are to a greater or less degree diminished, while the antero-posterior diameter of the excavation is found to be larger than natural; in other instances, although very greatly curved, it is not the less removed to a great distance from the pubis, whether at its base or apex.

In the second case, the anterior face of the sacrum being actually plane, or even slightly convex, as may be seen in a specimen belonging to the collection of the *Ecole de Médecine*, the pelvic cavity, instead of dilating betwixt its straits, becomes smaller, or, on the other hand, it enlarges regularly, from the promontory to the point of the coccyx, according as the base of the sacrum seems to have seen sawed forwards or backwards.

When the sacrum is too concave, and when both the straits are narrowed, if the head, by means of great efforts, comes down to the excavation, it stops there, becomes locked, can neither advance nor retreat, and renders the labor so dangerous that even the Cæsarian operation itself might be insufficient for its termination.

Fig. 4.



A pelvis in which the sinking in of the antero-lateral walls exists on both sides.

If it be too straight, and the lower strait is too much contracted, the head will descend at first very promptly, but as it passes through a conical canal, it will soon be arrested, and with difficulty clear the apex.

Whenever narrowness of one of the straits coincides with excessive amplitude of the other, the progress of the labor is necessarily arrested. Is the abdominal strait faulty through insufficient amplitude? the head will long remain arrested at it, but will pass through at last; then, meeting almost no resistance, it will tra-

verse the apex of the pelvis with great celerity, at a moment, perhaps, when the accoucheur, judging of the duration of the labor by the time that has been already occupied, is informing the assistants that several hours must elapse before it can be concluded. Has the inferior strait, on the contrary, lost its dimensions? the fœtus engages with extreme quickness, and the practitioner, who does not suspect the real condition of the pelvis, announces that the woman will speedily be relieved, whilst, perhaps, the very best planned succors are becoming indispensably necessary.

If the symphysis pubis forms a crest projecting backwards a few lines, as I have seen it do in two instances, or of eight lines like that of which M. Cloquet speaks, it does not prevent the delivery from being accomplished; but during the passage of the head it may contuse the bladder and the uterus, and favor the laceration of these organs. Sometimes one of the acetabula projects into the excavation, or it may be one of the sciatic spines, turned very much inwards, which deforms the cavity, as was observed by Levret, Barbaut, and Madame Lachapelle.

Exostoses of every sort and shape have been met with. S. Pineau found one on the right side behind the pubis in a woman who died without being delivered. M. J. Cloquet mentions having observed in a subject an exostosis of the pubis projecting into the bladder. Exostosis of the pelvis demands the Cæsarian operation, in such a case as Ruleau cites. In Fried's case, cephalotomy was resorted to; and in the case observed by Sandifort, it was formed by osseous concretions. Dæverén, who quotes another instance of the kind from Henkel, observed in the pelvis an exostosis of the size of a hen's egg. Dr. Leydig, who collected together several specimens of the same kind, also mentions one in which it was necessary to perform the Cæsarian section; and Burns speaks of a projection of bone two inches in length. Plessman, Autenrieth, and Madame Boivin, also mention intra-pelvic exostoses. M. Poupinel exhibited one to the Medical Society, in an individual of the name of Duret, which had at the superior strait only twenty lines. In the case which Trocon related to the Medical Society of Emulation, in 1817, it existed at the inferior part of the sacrum, rendering delivery impossible, and causing death. M. Damourette refers to a case that filled the entire pelvis, and reached to the right ischio-pubal ramus—and Barbaut mentions one precisely similar found by one of his friends in a woman who died in labor. One of the most remarkable cases, however, is that which M. Nægele has figured in M. Haber's thesis. In the case cited by Lassus, we observe two kinds of styloid apophyses behind the pubes. The exostosis, M. Danyau observed, was in front of the sacrum, and produced depression of the parietal bone of the fœtus. Scirrhus, fibrous tumors, &c., may also be developed so as to interfere with parturition; but it must be acknowledged that a majority of the faults of the excavation depend upon too great or too small a curve of the sacrum. Deformities of pelvis by anomaly, and alteration of soft parts, will be investigated under the article *Dystocia*.

SECT. III.—FAULTY DIRECTION OF THE AXES.

Nearly all these faults of conformation change, to a greater or less degree, the planes and axes of the pelvis. When the sacro-vertebral angle projects too much towards the pubis, the hollowness of the lumbar region being necessarily augmented, it happens that the angle between the spine and sacrum, instead of being one hundred and seventy-five degrees, may yield only one hundred and thirty-nine or even one hundred and twenty degrees; the axis of the superior strait, therefore, inclines forwards, and approaches the horizontal line; if the coccyx and the point of the sacrum, restrained by the sacro-sciatic ligaments, are not drawn away by this see-saw, the plane of the inferior strait is depressed to the level, or below the level of the horizontal line, and may even become parallel to the plane of the

superior strait, which in some measure justifies the opinion of Messrs. Sæmmering, Carus, Nægèle, &c., who think that even in the natural state the perineal strait inclines downwards, and not upwards. But this disposition, far from bringing the axis of the apex of the pelvis towards the perpendicular, or from inclining it backwards, as at the first glance might be supposed, carries it, on the contrary, considerably in front, inasmuch as the anterior face of the coccyx must determine its direction. M. Bello published a very remarkable case of a woman with the womb *en besace*, which required the Cæsarian section, and who died in the course of fifteen hours. In her case the pelvis was so bent that the perineal strait looked forwards, and the abdominal circle backwards. The pubis was turned upwards, and the convex surface of the sacrum downwards. The absence of one of the last lumbar vertebræ, and the sacrum forming at its base almost a right angle with the spine, completed this singular conformation. Here we could have recourse to neither the forceps nor version, even had the passage been sufficiently large, for the fœtus would not have been able to pass it. When the pubis rises, and the promontory becomes obtuse, the axis of the superior strait approaches towards the vertical line, and in some cases becomes parallel to the axis of the trunk of the body; if, in this case, the posterior wall of the excavation fails in being sufficiently concave, the two pelvic axes may become parallel, although the plane of the inferior strait be much inclined forward. This conformation, which especially favors the laceration of the perineum, gives rise, during labor, to difficulties that have not been sufficiently dwelt on in our classical works, and to which M. Lobstein endeavored to direct the attention of the profession in 1817. One of the pelves, of which this author speaks, presented fifty-five degrees, and the other seventeen, of inclination at the superior strait. In the first case, the head of the fœtus was with difficulty delivered with the forceps from their tendency to pass upwards, and in front of the pubes, as I once myself saw; the head being obliged to take a faulty position relatively to the body of the child or womb in traversing the excavation, may render the delivery extremely difficult. It is from this, says Lobstein, more than from arrest of the shoulders, that the fœtus is prevented from escaping in several of the cases mentioned by Heister and Levret.

SECT. IV.—CAUSES OF DEFORMITIES OF THE PELVIS.

In order correctly to understand the causes of faulty conformations of the pelvis, it is right to study them as they act in infancy, during puberty, or at the adult age. Until the sixth or seventh year, they are very well explained by a reference to rachitis, which is almost the only cause of them. The bones that are chiefly affected in this disease, being constantly pressed between two opposing forces, must give way in that direction in which the strongest force operates, or towards the point where there is the least resistance.

Thus, admitting that the softening of the bones is everywhere equally great, that the child is standing on its feet, and rests with the same pressure on both legs, it is evident that the base of the sacrum will be depressed towards the pubis, and the cotyloid cavities will be pushed upwards towards the promontory. Hence, there will be shortening of the sacro-pubic, as well as of the oblique diameters: if the child stands on its feet, but leans more on one foot than on the other, the oblique diameter of one side only will be contracted; if he remains seated, the hollow of the sacrum will become deeper, while the antero-posterior diameters of the two straits will be lessened. If he be habitually laid upon his back, the curve of the sacrum, instead of augmenting, will disappear, while the pelvi-vertebral angle and the coccy-pubic diameter will generally lose somewhat of their dimensions; a lateral posture will influence the transverse diameters, &c.

Although the weight of the body, then, will account for most of the vicious

forms of the pelvis, it must, nevertheless, be admitted that their production is, in certain cases, singularly favored by the active power of the muscles that surround the coxo-femoral articulation; so much the more, as the bones, most commonly softened only at some particular points, retain everywhere else all the solidity that is desirable.

After the first periods of childhood, the deformities of the pelvis are almost always the result of a disease, as of *malacosteon*, either general or partial, which is so common in England; of osteo-malacia; of irregular action of the muscles; and of bad habits in respect to attitude. It is thus that young girls, who, for the purpose of increasing the prominence of their hips, and the depth of the lumbar hollow, keep the pelvis and head thrown strongly backwards, while they project the abdomen and breast as far forward as possible, never think that, for the purpose of obtaining some elegance of form, they run the risk of being never able to become mothers, without exposure to the greatest danger. M. Nægèle, who does not think that rachitis is as often the real cause of deformities of the pelvis as is generally thought, justly remarks that malformations of this cavity sometimes take place in women already mothers of several children. Hunter speaks of a pelvis which only became contracted at the sixth pregnancy. M. Ordinaire gives another example of it from Stein, in which the deformity did not occur until the tenth! Similar cases have been mentioned by Cooper and Leber.

In a diseased hip-joint, the head of the femur has been seen to push the bottom of the acetabulum into the pelvis, and even to pierce through the acetabulum. Madame Lachapelle gives the case of a woman who was affected with a spontaneous luxation of the thigh bone, and in which the false acetabulum projected so far into the pelvic excavation as to interfere with the labor. Peu was so convinced that lame women are very subject to deformities of the pelvis, that he absolutely refused to marry one. The amputation of a thigh, but not of a leg, in an adult woman, and *à fortiori* in a young girl, is also capable of vitiating the pelvis, and in the following manner: The artificial limb, being obliged to bear upon the ischium, the acetabulum of the sound side has alone to support the weight of the body. Now, if the laws of pathological physiology require an osseous cavity to be filled, where it loses its relations with the organ naturally holding it, and when the organic arch, ceasing to be compressed, becomes contracted and depressed towards the cavity it contributes to form, the laws of mechanics teach us that in this state of things, the oblique diameter, corresponding to the natural limb, may become contracted so much as to render delivery dangerous, as has been proved by the observations made by D'Herbinioux and Madame Lachapelle.

Fractures and luxations, unequally consolidated, caries, syphilis, &c., have also sometimes given rise to obstacles to parturition. A woman, who had formerly had a fracture of the os ilium and of the ischio-pubal ramus, found that she could not be delivered without assistance. The forceps, badly applied, tore the vagina and womb, and produced a separation of the pubis and even breaking of the bones, and the woman died at the Hospital St. Louis, where M. Papavoine examined her. M. Villeneuve, who, like M. Faurichon, saw the womb and the vagina rupture in a woman whose sacro-pubal diameter measured only two inches and three-quarters, arrived at the following results, having carefully examined 119 deformed pelvis:—

1. Spontaneous delivery	25	children living	12	dead	13	women died	5
2. With forceps	24	" "	9	" "	15	" "	3
3. By version	27	" "	12	" "	15	" "	6
4. By the crotchet	8	" "	"	" "	"	" "	3
5. By cephalotomy	27	" "	"	" "	27	" "	10
6. By Cæsarian section	5	" "	4	" "	1	" "	5
7. By symphysiotomy	3	" "	3	" "	"	" "	1
	<hr/>		<hr/>		<hr/>		<hr/>
	119		40		71		33

He found, in fine, that deformity of the pelvis exists once in 294 cases, and that spontaneous delivery takes place in deformity of the pelvis once in 1383 cases.

To recapitulate, it may be said, that rickets almost always occasions deformed pelvis in young children, for at that age the members, of which the coxal bones constitute a part, generally participate in the diseased condition; while later in life, as, for example, at the approach of puberty, as osteo-malacia almost solely affects the spinal column, the curves of the spine may be carried to the greatest extent without the pelvis, in reality, suffering any change. For further details on this subject, the reader may consult, with advantage, the works of Portal, of Choulant, of Shaw, of Bamfield, of MM. La Chaise, Pravaz, &c., on spinal deformity and the diseases of the spine and pelvis.

SECT. V.—MENSURATION OF THE PELVIS.

When called upon to ascertain the state of a woman's pelvis, we ought to begin by interrogating the parents, or persons about her, as to the manner in which her childhood was passed; whether her first steps were slow and difficult, and whether she remained for a long time weakly. When we learn that the joints had been large, and as if swelled; that she had been rickety or phthisical, we may infer that rachitis had existed, and that her pelvis is probably deformed. We should next examine very attentively the other parts of her body, and if there be any preternatural curve in the spine, if the knees are large and turned inwards, if the lower jaw projects too much forwards, if the teeth are bluish and exhibit transverse striae, the same inference may be drawn; while we may suppose the contrary if none of the above circumstances should exist.

The theory of *homologues*—a theory which, as is well known, teaches that, in animals, not only is the right side an exact repetition of the left, but also that the lower half of the trunk represents the superior half, that the anterior half encloses the same elements as the posterior—has very naturally given rise to an idea that the pelvis ought only to be a repetition of the head. In Germany, therefore, where this doctrine has numerous partisans, there appeared, some years since, a work in which Dr. Weber endeavored to demonstrate that the head and the pelvis are subject to the same laws of evolution; that the good or bad conformation of one of these parts always corresponds exactly with a similar state of the other; that the narrowness and depth of the male pelvis, for example, are in exact accordance with the form of the male head, whose vertical and antero-posterior diameters, in general, exceed the transverse, while the opposite condition is observable in the female, &c.

Consequently, Dr. Weber desires that the inspection of the head should give us an exact idea of the condition of the pelvis. His method is very simple: the occipito-frontal, bi-parietal, and fronto-mastoid diameters of the head exactly represent the sacro-pubic, bis-iliac, and oblique diameters of the pelvis. The superior strait is proportioned to the cranium, and the face is proportioned to the inferior strait. Although Dr. Weber cites cases in support of his system, I am obliged, nevertheless, to say that I have seen the very best shaped pelvis coincide with the most deformed crania, and *vice versâ*; however, it appears to me, as it did to Madame Lachapelle, that the more the upper part of the face projects, the larger is the pelvis.

ART. I.—EXTERNAL EXAMINATION.

These preliminary researches being completed, we pass on to the examination of the pelvis itself, with all possible decency and circumspection. If the woman's gait is easy, free, and unconstrained; if the hips are on the same level, wider than the base of the thorax, and well rounded, the great trochanters properly separated

from each other; if she is not hollow-backed; if the sacrum has neither too much nor too little convexity; if the symphysis of the pubis is neither sunk in nor protuberant, nor too long, there will be some good reason for reporting a good conformation. By placing the fingers between the labia and the root of the thighs, we can ascertain whether or not the pubic arch is narrow, whether it forms a sufficiently large arc of a circle, and whether the ischia are too near each other. It is well to bear in mind, moreover, that the breadth of the hips is twice that of the superior strait.

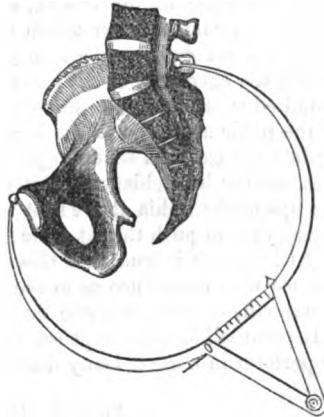
It is not necessary, for the purpose of correctly appreciating all these circumstances, to uncover the woman, or to make her lie down; if there be any fear of alarming her modesty, the examination may be made through her chemise. When all the characters of a good conformation are met with, it is common to dispense with any farther examination; but if some of those characters be wanting, we should endeavor to determine the kind of deformity that does exist. A hollow back, with a very decided saliency of the pubis, indicates an extreme degree of inclination, and a trilobated form of the superior strait. If the symphysis be at the same time depressed, we may affirm that the sacro-pubic diameter is shortened, and that the strait is bilobated, or of the figure of an ∞ . Hips uneven, or too much elevated, and depressed external iliac fossæ, disclose a fault of the bis-iliac diameter. The approximation of the ischia, the convexity of the sacrum, and the forward inclination of the coccyx need only to be hinted at to render it easy even to the least skillful person to recognize them in an instant.

As it is essential to the happiness of families that we should arrive at mathematical results, and as the employment of the hand yields them only in a vague and approximative manner, the accoucheurs have invented an infinity of instruments for the purpose of exactly measuring the pelvis, whether externally or internally; these instruments are called pelvimeters, or mecometers.

Only two of them can be applied externally: one, the calliper (*compas d'épaisseur*) of Baudelocque, or rather *céphalomètre* of Stein, which is almost exclusively employed, on account of its simplicity; and the other, the mecometer of Chaussier, which is scarcely used except at the Maternité of Paris. The calliper serves to measure, 1. The sacro-pubic diameter, by placing one of the buttons in front of the symphysis pubis, and the other on the first spinous process of the sacrum; 2. The oblique diameters, by placing one of the ends of the calliper on the external surface of the great trochanter, and the other on the projecting portion of the opposite sacro-iliac junction. In the first situation, the *curseur* must measure seven inches; so that by deducting two inches and a half for the sacrum, and half an inch for the pubis, there may remain four inches for the antero-posterior diameter of the superior strait. For the oblique diameters, it should measure nine inches, for we must deduct two inches and three-quarters for the trochanter, the neck of the femur, and the acetabulum, and one inch and three-quarters for the posterior symphysis.

Baudelocque has asserted that the thickness of the bones rarely varies more than one or two lines in the antero-posterior diameter, and that the results ob-

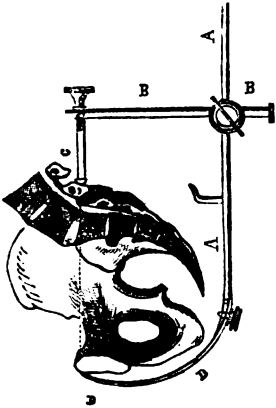
Fig. 5.



Baudelocque's callipers applied to the measurement of the antero-posterior diameter of the superior strait.

tained by the calliper may be relied on. Madame Lachapelle, on the contrary, regards this mode of proceeding as very deceptive, and thinks the thickness of the sacrum may vary from four to five lines. Madame Boivin goes still farther, for she says that the thickness indicated by Baudelocque varies from four to twelve

Fig. 6.



Von Huevel's pelvimeter, converted into a pair of callipers.

lines. One thing is certain, that leanness or fatness does not diminish or increase, in a sensible degree, the thickness of the soft parts on the points to be touched by the instrument, and that the differences of thickness of the sacrum and pubis mentioned by Mesdames Lachapelle and Boivin, are at least extremely rare.

As to the measurement of the oblique diameters, the length of the neck of the femur has appeared to vary too much to permit practitioners to repose much confidence in it; but I think, on this subject, there has been a very general misapprehension; for, among a pretty considerable number of well-formed pelves, I have never found in this direction a difference exceeding a quarter of an inch, more or less, than the one indicated. As the cristæ of the ilia may be considerably raised, or much depressed, without the straits having undergone any modification, we should be exposed to too many, and to too serious mistakes, were we to take half the distance between them as the measure of the bis-iliac diameter. This last is surrounded by too many muscles, and, moreover, is of too little importance for us to measure it in any other way than with the hand.

The fingers suffice for ascertaining the state of the inferior strait. According to the authors, the woman should be seated upon the edge of a chair, but she may also be examined while standing up. The ball of the forefinger is placed upon the point of the coccyx, and the point of the thumb on the edge of the sub-pubic ligament, after which the two fingers, being held at the same distance apart, are referred to a graduated scale to ascertain the degree of separation. While the extremity of the index is pressed against the point of the coccyx, the radial edge of the finger, instead of the thumb, may be pressed against the top of the pubic arch; but there is more danger in this method of painfully pressing against the external sexual organs, if their sensibility happens to be excited. To measure the bis-ischiatic diameter, we must press the points of two fingers against the lips of the ischia at the spot where the great sacro-sciatic ligament is inserted, taking care to push the fat aside by gentle pressure.

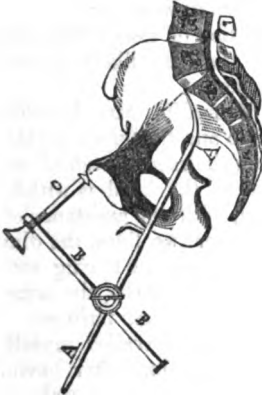
Although it is true that this exterior exploration does not enable us to pronounce with confidence as to the nature and degree of deformity of the pelvis, it is nevertheless the only one we can have recourse to in virgins; in other women, it is permissible to attempt the internal mensuration, which it has been proposed to perform in a great many different ways.

ART. II.—INTERNAL EXAMINATION.

Coutouly was the first to propose measuring the interior of the pelvis by means of a *pelvimeter*, which bears his name. It is impossible to convey a clearer idea of such an instrument, frequently modified by its inventor, than by comparing it to the shoemaker's rule employed in measuring the length of the foot. It is introduced, closed, into the vagina, after which it is opened, and one of its branches rests against the pubis, while the other is applied to the sacro-vertebral projection. Now, the movable or sliding branch being graduated externally, it is easy to estimate the distance that separates the two vertical pieces. In this

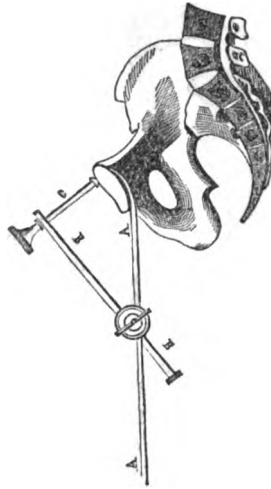
manner, we can measure the sacro-pubic diameter with the most rigid exactness on the dried pelvis, but in living women Coutouly's instrument is rarely applicable, except in the case of pregnancy; it is not so, however, in a woman in labor, if

Fig. 7.



The mensuration of the sacro-pubic diameter with Von Huevel's pelvimeter.

Fig. 8.



The measurement of the symphysis pubis with the same instrument.

the summit of the head be engaged in the strait; besides, when it can be made use of, its introduction must always be very painful, and its results will be most generally fallacious. This pelvimeter, therefore, deserves the neglect into which it has sunk. Many accoucheurs have endeavored to find a substitute; but, as those they have proposed have not fulfilled the ends intended by their authors any better than Coutouly's, they have been quite as little employed as his. The thimble with which Asdrubali armed the forefinger, in order to increase its length; the sort of foot-rule, in the shape of a compass or pincers, with branches of unequal lengths, which can be opened in the pelvis; those made with the arms straight, hollow, or full and graduated, according to the plans of Stein, who preceded Coutouly in this matter; those of Creve and Aitken, the pelvimeter invented by Traisnel, and that since proposed by Bang, afford us results not at all more precise than the others.

The internal mensuration may be well effected by the fingers or hand. Mr. Ryan says that, in England, they never use anything but the fingers in measuring the straits. When the woman is not in labor, or when the head is not as yet engaged, the point of the forefinger may readily be carried to the promontory: the root of the finger is then raised up against the arch of the pubis, and the place where it touches is marked with a finger nail of the other hand. Nothing can be easier, after this, than to ascertain the distance from pubis to sacrum. Unlike other pelvimeters, the finger is a *feeling* instrument, the point of which will not slip away from the promontory of the sacrum without the operator knowing it; thus one of the most frequent causes of error is at once obviated. It is true that, as the line represented by the finger falls below, and not on a level with the top of the symphysis, as it ought to do, we commonly find the length greater than it ought in reality to be; but, by subtracting four or five lines on account of this obliquity, we shall have for the remainder pretty exactly the

Fig. 9.



The mensuration of the sacro-pubic diameter by the finger.

measurement of the space between the sacro-vertebral angle, and the top of the symphysis pubis. There are two circumstances, however, that may easily lead us into error. The first is where the upper edge of the symphysis seems to have fallen backwards; and the second, where the contrary obtains. Here, indeed, the antero-posterior diameter of the superior strait might appear very great, although in fact it were very small, and reciprocally; but the application of the calliper externally would readily correct the mistake likely to arise from such a disposition of the bones.

During labor, we can, if needful, pass the whole hand into the vagina; the thumb and forefinger are then separated, so as to place one on the sacro-vertebral angle, and the other behind the pubis; the hand is withdrawn in that position, and we can, with the assistance of a foot-rule, determine, within one or two lines, the dimensions of the sacro-pubic diameter, without having recourse to the loop of thread proposed by Starke, the armed hand of Koeppé, or any other of the thousand inventions for that purpose. Instead of using the thumb and index finger, I have sometimes availed myself of the index and medius fingers passed high up into the vagina; after having separated them as far as possible, and placed the points of them on each extremity of the diameter, which it is designed to measure, two fingers of the other hand are to be placed between their roots in order to keep them apart, and then they should be withdrawn from the female organs.

Whenever it is important to know the precise condition of the strait, and the hand can be passed into the vagina, we should always introduce it. Flamant was constantly in the habit of recommending this at the school of Strasburgh; M. Guillemot strongly insisted on it, and also M. Ordinaire. In like manner does M. Dot define the touch, the exploration of all the parts connected with generation, and delivery of the fœtus by means of the fingers or hands, with instruments or without them. De la Motte has stated that delivery is almost impossible when the closed hand is unable to traverse the superior strait. In a case of this kind, he was obliged, he says, to draw down the feet with two fingers. The child was small, and came away scarcely alive, which does not appear at all singular. V. Swieten expresses the same idea, as Levret also did, still more decidedly, in saying that a pelvis small enough to prevent the entire hand from entering would not permit the escape of a living child. Lauverjat was wrong in not receiving this opinion, for it is perfectly correct. In order to have full benefit of this procedure, the accoucheur should have studied previously the various dimensions of his own hand; know precisely the length of the index finger, as far as the commissure of the median finger and the root of the thumb extended, then flexed; ascertain the circumference and the different diameters when it is closed; and he will be able to tell the length which the greatest separation of each finger measures.

With the finger we have the advantage of appreciating all sorts of deformities of the pelvis, whatever be their seat, their nature or degree; the straightness of the sacrum, as well as excess of its curve; also, exostoses and tumours of whatsoever nature, the transverse as well as the antero-posterior diameters. By pressing with a certain degree of force against the point of the coccyx, it is possible even to learn how much may be gained in the coccy-pubic diameter by the retreat of the coccyx backwards. Those who have objected that the finger is not always long enough to reach the angle of the sacrum have forgotten that a pelvis, in which the forefinger cannot reach to the promontory, is thereby proved to be

so spacious that the accoucheur need not trouble himself to examine it any farther.

Moreover, it cannot be denied that, although it is never very difficult to discriminate between a deformed pelvis and one that is not so, it is nevertheless impossible, in certain cases, to determine the exact nature and degree of each particular deviation; it is, therefore, no more than right to give the praise they deserve, to the efforts lately made by Madame Boivin to obtain more precise results: the instrument which she has invented, and which she has named *intropelvimeter*, although founded on the same principles as Coutouly's, differs from it, nevertheless, very considerably. It might be compared rather to what Stein calls *grand pelvimeter*. As its branches are separately introduced, one into the rectum, and the other into the vagina, and as the curve of the rectal branch is very deep, it may be used in the virgin as well as in the pregnant woman, and at any stage of labor; it may even be employed in ascertaining the oblique and transverse diameters, and by altering its vaginal branch it could easily be converted into a calliper. Nevertheless, I doubt that we shall be able to obtain from this apparatus such exact results as its inventor seems to hope for.

However multiplied the means of measuring the pelvis, it must have been seen, from the foregoing, that even the most skillful accoucheur will never be able to attain to the mathematical precision that is desirable. In corroboration of this, I may mention the following case: A rickety woman, seen by M. Deneux at the Hospital of the Ecole de Médecine, was examined carefully at the period of delivery. Once they found three inches, and at another time two inches and a quarter, at the sacro-pubal diameter. The forceps became necessary at the inferior strait. After death, it was observed that the smallest diameter was two inches and eleven lines! But is this a reason for rejecting them entirely, and asserting with Puzos that the operation itself is of no use? This author, otherwise so correct, has assuredly gone too far in saying that a young woman ought to be forbidden to marry, if she had ever been affected with rickets, or if she has a spinal deviation; and humanity and justice both appeal from his judgment. How many ill-shaped women bring large robust children with the greatest ease into the world! Another serious inconvenience might attach to such a general proscription: many women would pay no respect to the prohibition, and not be slow in convincing themselves that they had been frightened with dangers wholly chimerical. Hence, what almost always occurs when the effect does not follow the threat, those who run some risks upon being married, and those who run no risks at all, would equally turn a deaf ear to advice. On the other hand, it would be absurd to deny the importance of pelvimetry, in labor, when a decision must be made between embryotomy and the dangerous operations that may be performed upon the mother. Finally, by citing, for the purpose of proving the uselessness of pelvic mensuration, the cases of women who were not afraid to become pregnant again after having once undergone the Cæsarian operation, Puzos seems to me to have misunderstood their true position. Is it really the attraction of pleasure that always induces them to yield to the brutal husband that the law has given to them? Is it fair to compare a woman who fears, above all things, to lose the affections of a man to whom she is united for life, to a young girl, who, free from all entanglements, ought to think first, and above all, of her own safety? (For particulars, see the article *Touch* in this volume.)

PART II.

OF THE SEXUAL ORGANS.

IN women, as in men, the Organs of Reproduction are partly enclosed within the pelvis, and partly exposed on the exterior surface of that cavity.

CHAPTER I.

OF THE EXTERNAL ORGANS OF GENERATION.

UNDER the title of external genital organs are generally comprehended the Mons Veneris, the Vulva, and the Perineum.

Mere appendages of the internal organs, these parts perform only a secondary office in the great generative function; but during the expulsion of the ovum, they undergo changes, and are exposed to dangers, which render the exact knowledge of them very useful to the physician-accoucheur.

SECT. I.—NORMAL STATE.

ART. I.—THE MONS VENERIS.

The Mount of Venus (the *sur-pubal eminence*, *pubes*) is a sort of relief formed by the soft parts that cover the front of the pubis; it is principally composed of fat, fibrous filaments, and cellular tissue. In fat women, it is sometimes separated from the belly by a transverse groove of considerable depth; the degree of its projection also varies on the same account, but much more on account of the projection of the bones which support it being different in different subjects.

The skin that covers it is very thick, elastic, not very extensible, and covered with hair in the adult; it contains a great number of sebaceous follicles, and the whole represents a sort of cushion, the uses of which are, according to many authors, connected with the business of copulation. The composition of the mons Veneris very fully explains the violent pain which accompanies phlegmonous inflammation of the part, and enables us to comprehend why abscesses formed within it should be promptly opened.

ART. II.—THE GREATER LABIA.

A sort of cutaneous folds which seem to result out of the bifurcation of the lower part of the mons Veneris, the two labia separate farther and farther from each other, for about half their length, and then approach to be united again about an inch in front of the anus, exhibiting two commissures, one superior or pubic, the other inferior or perineal. The external surface, formed by the skin

of the thighs, is, like the pubes, covered with hair at puberty. Their internal surface is smooth, glabrous, and of a rose color; a considerable number of sebaceous or mucous follicles are observed upon it. The accoucheur ought to be aware that the matter furnished by these follicles may become acrid, and irritating to such a degree as to give rise to a discharge that has often been mistaken for blennorrhagia, particularly in uncleanly women.

In young girls, the thickness of the labia is greater above than below. In women who have borne children the contrary commonly obtains. Moreover, before the age of puberty, they are very close together, and pretty firm. After marriage they separate from each other, become flaccid, bluish, and lose the regularity of their form.

Composed, like the mons Veneris, of filamentous cellular tissue and fat, they are also, like it, subject to phlegmonous inflammation, attended with violent pain, and which ought to be opened early, taking care to plunge the instrument to a considerable depth if it is desired to avoid relapses and sinuses.

As the tissue of which they are composed is much looser than that of the mons, and they are exposed to more friction, they are subject not only to purulent collections, but also to bloody extravasations, serous effusions, &c., which may acquire a considerable size.

The great labia may also become the seats of hernia, and other tumours, which should not be confounded with those above mentioned. The slit which they circumscribe, and which is placed in the direction of the coccy-pubic diameter, is called the *vulva*, while the whole of the external genitals is specially designated by the word *pudendum*. This slit contains several parts, situated in a direction from above downwards: these are the lesser labia and the clitoris, the vestibule, the meatus urinarius, the vulvar orifice of the vagina, the hymen, the fossa navicularis, and the fourchette.

ART. III. — THE LESSER LABIA.

Thus denominated because they are, in fact, much smaller than the preceding, known also as the *nymphæ*; the lesser labia have been compared to a young cock's comb. They arise, superiorly, by two branches, which are continuous with the prepuce of the clitoris: they then descend, divergingly, on the inner face of the greater labia, and terminate insensibly about the middle of these latter, opposite to the orifice of the vagina. They are of a firm consistence, and a reddish color; they are formed of a tegumentary fold of a mucous character, very delicate, and very sensitive, and also of an erectile or spongy tissue, very closely resembling that of the corpus cavernosum in men.

At birth the nymphæ generally protrude beyond the level of the greater labia; in young virgins, on the contrary, the labia almost entirely conceal the nymphæ; and in adult women who have had children, the lesser labia again become very salient, while they lose their firmness and their rosy hue.

In this respect, numerous varieties are to be observed; sometimes, indeed, their appearance undergoes no alteration; at other times, they acquire a considerable length, either as regards their whole extent, or only near their posterior extremity. This hypertrophy, which is in some cases natural, but most commonly accidental, is sometimes carried to such an extent as to interfere with coition; so that it was formerly not uncommon to amputate the nymphæ. In some countries, they are, naturally, much longer than in our European regions. In Persia and Turkey, for instance, if we may believe the reports of travelers, it is frequently found necessary to excise them. Haller speaks of it as being common among the natives of the South, particularly the Moors and Copts.

From the time of Kolbe, all the naturalists have spoken of a peculiar fold known as the *Hottentot apron*, and on which Tackard, Sparman, Banks, Peron,

Levaillant, Lesueur, and several others have emitted very different notions. Evidently depending on the prolongation of the lesser labia, as was seen by Ten-Rhyne, it is not among the civilized Hottentots that it is met with, but among the savage tribes of the environs of the Cape, discovered by the Dutch, who called them *Bogismans* or *Bochimans*, that is to say, *Bushmen*. On this subject no further doubt can be entertained, since an individual of this species came to be exhibited at Paris, under the title of the *Hottentot Venus*: in fact, the drawing of it furnished by M. Flourens, and the descriptions published by MM. Cuvier and Virey, show that, instead of being three or four lines, the nymphæ of this woman were several inches in length. It is true, there is a wide difference between these dimensions and those attributed by certain travelers to the *Hottentot apron*; but it is easy to conceive of an extent of six or eight inches in an organ which has been seen actually to measure three inches, provided that, by means resorted to in that country, they are subjected to continual tractions, always increasing in force, from childhood up to adult age.

The uses of the nymphæ are little known. The ancients believed that they served to direct the course of the urine, whence their name of nymphæ. Dionis and Levret, like all the writers who have followed them, pretend that they unfold or disappear in labor so as to favor the enlargement of the vulva; but this assertion is wholly false. It is said, lastly, that, being endowed with an exquisite degree of sensibility, their use is to augment the pleasure of the venereal act.

ART. IV.—THE CLITORIS.

The *clitoris* is a tubercle which authors have compared to the uvula, and which represents, on a small scale, the penis of the male. In the clitoris are distinguishable a loose extremity, round, and of an acorn shape, and a body which is attached by two roots to the ischio-pubic rami; but it has not a canal, as is the case in the male yard. A fold of skin covers it, serves as a prepuce, and then proceeds to disappear in each of the lesser labia, of which it seems to be the root.

During the first months of uterine life, the clitoris is as long and as large as the penis; at birth its dimensions are still considerable. But from that time it ceases to grow, if it does not even diminish, so that at the age of puberty it is in general not more than four or five lines in length. There are, however, some women in whom it obtains a much greater development. It has been, on some occasions, seen to reach the length of from one to five inches; in such cases, it scarcely differs from its analogue in the other sex.

Such a disposition as the above is further remarkable, inasmuch as it coincides with certain characteristics which have even led to the belief that individuals of such conformation belonged to neither sex peculiarly; that is to say, these women generally have very small breasts, hard features, a beard, and a temper which leads them to prefer labor and occupations foreign to the pursuits of the sex. They are stout women, and are fond of procuring illicit enjoyments with persons of their own sex. In a word, such are the individuals who have generally given rise to the questions relative to hermaphroditism.

Such is the intimate structure of the clitoris that, during coition, the blood accumulates within, swells it, and occasions its erection; the delicate membrane that invests it being of the same nature as that of the nymphæ, and very sensitive, it has in consequence been concluded that with the nymphæ it is the chief seat of venereal pleasure. De la Motte has very properly observed that this organ can in no way interfere with delivery, and justly ridicules the apprehensions, so often manifested by Peu, to the contrary. The clitoris is subject to certain morbid affections; its extremity may become transformed into a fibrous mass, described by Deschamps, and which has been often observed. The clitoris rarely exhibits any morbid affections; but as its size, when excessive, may incom-

mode during copulation, and as its uses are not very essential, it has, in several instances, been subjected to the operation of amputation. In the case of *Molinette*, it weighed nine pounds, and the operation was perfectly successful. *Kramer* was no less fortunate in a case where it was three fingers long, and presented the appearance of a cauliflower. We are indebted to *Macfarlane* for another successful case of the kind.

ART. V.—THE VESTIBULE.

Circumscribed by the clitoris, the inner face of the nymphæ, and the meatus urinarius, the *vestibule* is a small triangular space, depressed, corresponding to the upper part of the arch of the pubis, through which *Celsus* and *M. Lisfranc* have recommended that the bladder should be opened, for the purpose of extracting the stone in females, and which performs no special function relative to generation.

ART. VI.—THE URETHRA.

Beneath the vestibule is perceived the orifice of the *urethra*; this opening is separated from the vagina only by a kind of tubercle, which projects more or less in different persons, and which terminates its anterior middle column. On account of this tubercle, nothing is so easy as to sound a woman's bladder without uncovering her, for, after a very little practice, the finger suffices for distinguishing it and guiding the sound. In women the urethra is large, conical, about twelve or fifteen lines long, scarcely curved; it has neither prostate gland nor bulb; its lower wall may be said to be confounded with the anterior wall of the vagina, and would be rubbed, contused, and lacerated much more frequently than it is, were it not that it is situated at the very top of the pubic arch, in a free space, which is so narrow that neither the occiput nor forehead of the child can reach it to lodge in it. Its natural direction, shortness, extensibility, and width, readily explain the ease with which the catheter is introduced, the rare occurrence of urinary calculi in women, and the fact that even fecundation has sometimes taken place where the womb opened only into the bladder. In a case reported by *Flamant*, the finger was easily introduced, the vagina was closed by the hymen, and the woman was pregnant. In a woman who had no womb, and whom *Meyer* dissected, copulation was performed through the urethra. *Gruner* mentions a case of the same kind, and *Morgagni* tells us that the husband of another imperforate woman endeavored unsuccessfully to perform the venereal act.

ART. VII.—THE HYMEN.

The *orifice of the vagina*, irregular, and of greater or less size in women who have borne children, more rounded, but of equally variable dimensions in married women who have never yet become mothers, is in virgins contracted by the *hymen*.

§ 1. DESCRIPTION.

Admitted by some and rejected by others during the seventeenth and eighteenth centuries, the hymen, and not the *membrane of the hymen*, as it is denominated in several French works, is a fold which always exists, provided it have not been destroyed, in young girls. It would even appear that it exists in several animals. In a work presented to the institute in 1805, *M. Duverney* endeavors to prove that it is met with in many apes, bears, hyenas, hares, etc., and I think I may say it is also met with in the giraffe. *Cuvier* accords it to the daman; *Steller* to the sea cow of the north. I do not see why we should deny it to the ass and the mare.

PLATE III.

THE GENITAL ORGANS.

FIG. 1.

- a, a. The greater labia.
- b. The clitoris covered with the prepuce.
- c. The perineum.
- d, d. The lesser labia.
- e. The vestibule.
- f. The meatus urinarius.
- g. The vagina.
- h. The hymen.
- i. The fourchette.
- j. The fossa navicularis.
- k. The posterior commissure of the vulva.
- l. The bladder.
- m. The womb slightly elevated.
- o, o. The ovaries
- p, p. The Fallopian tubes.
- q. The commencement of the rectum.
- r, r, r. The intestines collected in the left iliac fossa.

FIG. 2

Represents the *uterus in situ*, at full term, distended with the product of conception, inclined to the right, and twisted on its own axis from behind forward, and from left to right. (Taken from nature.)

- a, a, a. The anterior walls of the uterus.
- b, b. The Fallopian tubes.
- c, c. The ovaries.
- d, d, d, d. The round ligaments.
- e, e, e. The intestines pushed back by the uterus.
- f, f. Flaps of the abdominal walls turned back.

Fig 1

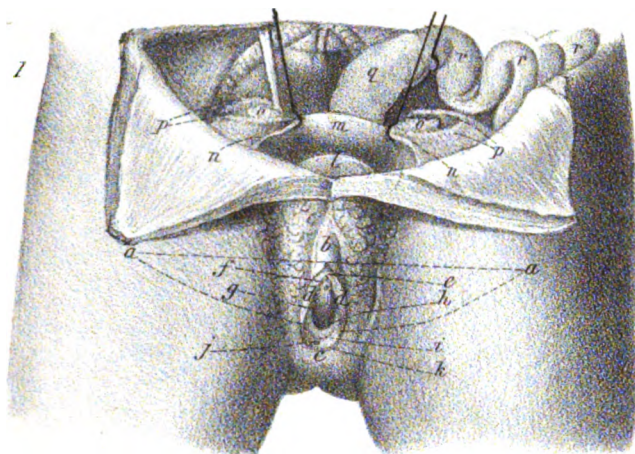
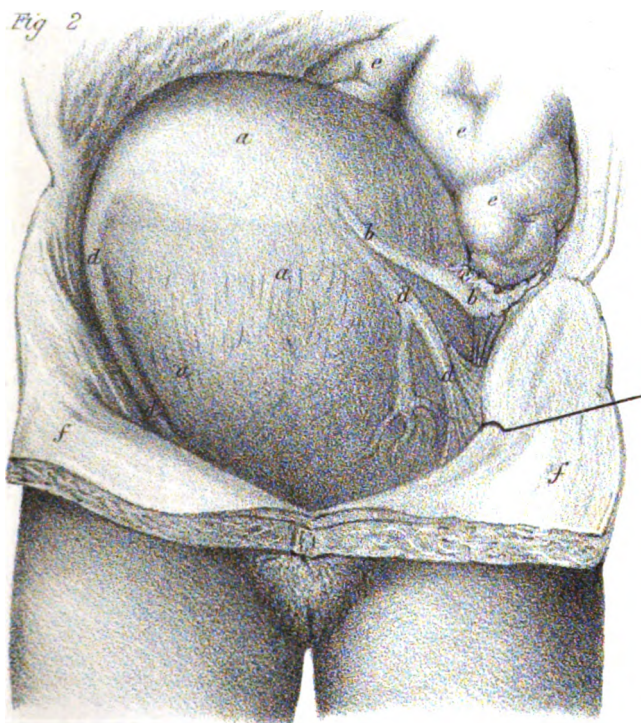


Fig 2



In shape resembling a half moon, with its concave and sharp edge turned forwards, its extremities are sometimes so much prolonged as to unite under the urethra, and thus form a circular valve, whose breadth, however, diminishes as it approaches the meatus urinarius: being on its convex edge continuous with the mucous membrane of the vagina and vulva, the hymen may contract the entrance of the vulvo-uterine canal in very various degrees, and even close it entirely. Its circle always contracts from behind forwards. I have sometimes detected muscular fibres in it, which were arranged in a decussating manner, as in the womb; in such cases, it was thick, strong, elastic, and very much developed. At other times, I have seen it thin, transparent as a pellicle, and very easily broken. In general, it is thicker at birth than at any other period of life. In new-born infants it often presents the shape, the rosy tint, and softness of the lesser labia.

Regarded as the seal of virginity by the vulgar, and for a long time so considered by medico-jurists and magistrates, the hymen has on more than one occasion been the cause of an iniquitous decision by the tribunals, either in condemning an innocent woman, or, on the contrary, in absolving one who was scandalously guilty. But at present it is universally admitted that a thousand causes foreign to the act of coition may destroy it, and that copulation itself does not always occasion its rupture. If this membrane be thin, delicate, and broad, a sudden or extensive movement of the limbs, excoriations, the appearance of the menses, &c., may cause it to disappear. If it be thick, muscular, elastic, but narrow, the sexual union would not be prevented, and the hymen might remain whole until labor should take place, as is proved by the cases mentioned by Paré, Nægèle, and others; but I believe it incapable in any case of furnishing a real obstacle to the escape of a child.* If the hymen be broad and resisting, while at the same time it either partially or completely closes the canal of the vagina, it might form an insurmountable obstacle to the flow of the menses outwards, and by retaining the blood in the vagina or womb, give rise to symptoms that would be more or less important, according to circumstances. Smellie, Denman, &c., report the cases of women in whom this state of things produced all the general symptoms of pregnancy, and who recovered their ordinary health as soon as an incision into the hymen had allowed of the escape of the blood with which the parts were filled. I have been consulted on account of one young lady, twenty-two years of age, whose hymen had prevented the consummation of marriage. I met with another specimen, in the corpse of a woman about forty years of age, who had cohabited with her husband for a long time, but without having any children. As a general rule, however, the hymen is ruptured at the first sexual approach, which, in consequence of this laceration, is accompanied with more or less pain, and a slight discharge of blood. When once torn, its shreds contract, and give rise to one or more tubercles, known by the name of myrtiform caruncles.

§ 2. VARIETIES.

It appears to me there are six distinct kinds of hymen:—

1st. The semicircular, in which the hymen is formed by a narrow fold strong

* I consider the hymen to be a fold or duplicature of the mucous lining of the *orificium vaginæ*. It is in all respects analogous to the *valvula conniventes* of the bowel. In many individuals it is ruptured by the sexual congress; in others it escapes uninjured, and is not *unfrequently* met with in the examinations made during the conduct of labors. Like the other tissues with which it is connected, it is tractile and distensible to such a degree that it is even possible for a child to be born without destroying it, as I have ascertained in my attendance on persons confined with a second parturition. I make this statement with confidence, as I am sure it will be confirmed by persons much engaged in obstetric practice, who will take the trouble to make the inquiry.—M.

enough to admit of copulation without being ruptured. This variety, though not very common, is by no means rare.

2d. The crescentic, in which the concave edge approaches more or less the urethra, so as to diminish the entrance into the vagina posteriorly. In this case, it is almost invariably ruptured in coition.

3d. The circular, in which the free edge, very much thinner than the other, is often fringed, as it were, leaving an opening sometimes slightly round, but generally closer in contact with the anterior wall of the vagina than the posterior.

4th. It often presents the form of a disk or perfect diaphragm, usually pierced by a certain number of small holes like a watering-pot, and sometimes without the least opening.

5th. In place of a simple valve or a circle, we observe a small bridle, or a small cord, under the urethra and at the concave edge of the hymen, as in the cases reported by Smellie and Millot.

6th. Finally, there is sometimes a second a few lines above the first, as Messrs. Ruysch, La Gros, and Willis have observed.

In a woman F. de Hilden speaks of, this membrane, pierced with holes, permitted pregnancy, although the husband had demanded a divorce, in consequence of being unable to have connection. In the case reported by Viardel, there were also four small holes, but this did not do away with the necessity of an operation. It was the same in the woman Flamant mentions, reported by M. Villette, and who had the urethra so largely dilated. Peu remarks that it presented only a small opening in two women, who notwithstanding became pregnant, and on whom they were obliged to operate at the time of labor. In another, examined by the same author in 1666, it was completely closed. Doctor Backer, and Merri-man the uncle, appeared to have met with two or three such cases. It must have been the same in the cases of Chamberlain, Fryer, and one of those of M. Nægèle, for there were retention of the menses and projection of the membrane outside. Paré mistook it for a morbid product in a girl he had to operate on.

§ 3. INCISION.

In women impregnated notwithstanding the persistence of the hymen, we operate either during pregnancy, as in one of the cases of Hilden, or at the period of delivery, as Peu did in a woman who did not conceive until five years after the death of her first husband, and in the second year of a second marriage, and as is recommended by Ruysch and Nægèle. The operation for imperforate hymen is also performed before marriage or in early youth, by way of precaution, to allow the menses to pass off. When the persistence of the hymen is likely to cause perforation of the perineum from the retention of the menses, the operation becomes of the utmost importance, as is seen in the two cases of Amand; it causes pain, as in delivery, and in menstruation, also suppression of urine, pain during fecundation, convulsions, etc. This having been sometimes followed by serious consequences and even death in some cases of retention of the menses, it is best to perform it during infancy; but it would be wrong to confine one's self to a simple slit, as Millot recommends. A crucial incision is then indispensable to avoid a return, which I have seen occur in two instances.

ART. VIII.—THE MYRTIFORM CARUNCLES.

There are still a great many physiologists who think that the myrtiform caruncles are special organs, and independent of the hymen. They found their opinion on the circumstance that they are sometimes found even where the hymen is whole, and that their number and situation do not appear to be accounted for on any other hypothesis. The opposite opinion tends, it is true, to predominate; but, as its supporters have not refuted their antagonists so convincingly as to dis-

sipate all doubts on the subject, I have sought for the cause of such a discrepancy of sentiment, and believe I have discovered it. Of the four caruncles commonly observed at the entrance of the vulvo-uterine canal, and which correspond to the four extremities of the vertical and transverse diameters of this opening, two—namely, that which is near the meatus urinarius, and that which is near the fourchette—belong to the middle columns of the vagina, while the other two only are the remains of the hymen. The former, therefore, exist even in virgins, while the latter ought only to be met with after coition. It is clear, moreover, that these latter, or the lateral caruncles, may vary in number, size, and situation, according as the hymen is broken into two, three, or four shreds, of equal or unequal sizes, in this or that direction, and according as the hymen itself was of greater or less thickness and breadth; these latter caruncles are altered in form, and sometimes disappear entirely in consequence of labor, while, on the other hand, the medium caruncles enlarge, rather than diminish with the progress of age.

ART. IX.—PERINEUM, FOSSA NAVICULARIS, FOURCHETTE, FRÆNUM, COMMISSURE.

Between the perineal commissure of the vulva, or greater labia, and the convex edge of the hymen, or posterior semi-circumference of the outer orifice of the vagina, is seen the *fossa navicularis*; the fourchette or the frænum forms its anterior edge, and ought not to be confounded with its posterior edge, which is the commissure itself. It most commonly happens that the fourchette is torn in a first labor, and the fossa navicularis is thereby forever destroyed.

The perineum, which separates the vulva from the anus, is scarcely an inch or an inch and a half in length; its inferior surface is composed of skin; it happens but rarely that it is covered with hairs, which, if they be cut off, produce, while growing again, the effect of a brush, and sometimes occasion intolerable pain, the cause of which it is well to understand. Above, that is, between the skin and the point where the rectum and vagina come into immediate contact, there is a triangular space filled with fleshy fibres, cellular tissue, fat, nerves, and vessels, and which, constituting a part of the perineum, allow it to elongate itself very considerably during labor; to such a degree, indeed, as will be seen in the sequel, that, from being only an inch long, as in its natural state, it may be extended even to four or five inches in length, when most strongly pressed upon by the head.

Without repeating on this occasion what I have elsewhere said, of the arrangement of the parts that compose the female perineum, I think it may be, nevertheless, useful to recall to mind the mean dimensions, which, after a great number of observations, I have been enabled to establish in relation to the various objects which I have now examined.

1. That from the upper part of the pubis to the clitoris is two inches and a half.
2. From the anterior commissure of the vulva to the anus, three inches and a half.
3. From the clitoris to the posterior commissure of the vulva, one inch and a half.
4. From the posterior commissure of the vulva to the point of the coccyx, three inches.
5. From the coccyx to the anus, about eighteen lines.
6. From the anus to the vulva, fifteen lines, allowing only a few lines besides for the orifice of the rectum.

It is also useful to know that the constrictor vaginæ muscle, which is analogous to the accelerator urinæ of the male, is enclosed within the body of the

greater labia, and that it is so strong in some individuals as to contract with energy during coition, and considerably lessen the size of the orifice of the vagina; that the only important artery in the neighborhood of these parts, the pudic artery, is confined, as it were, entirely towards the circumference of the perineal strait; and consequently that it is not on account of hemorrhage that lacerations of this region are likely to prove dangerous.

SECT. II. — ABNORMAL STATE.

I have already spoken of the preternatural development of the clitoris and nymphæ, as well as the extreme length of these parts among certain nations. I have now to remark that the greater labia have been in some instances found wholly wanting, in consequence of malformation of the individual. Sometimes they adhere to each other, either at one spot or throughout their whole extent, as in the three examples cited by Madame Boivin, as was seen by Cassan, M. Williaume, and Rossi, who saw one case each, and as is frequently met with in Persia, Egypt, Turkey, and throughout almost the whole of Africa, where the barbarous custom of infibulation is still practiced. Who is ignorant of the young Roman woman whose vulva was agglutinated, and who, thinking herself in no danger, gave herself up to coition, and became pregnant against her will? Borelli says he saw, in the hospital of Castro, a little girl who had two vulvas, one above the other. It might also be said that where the vagina is completely double, there are two lateral vulvas. Arnaud mentions two similar cases in which the labors were difficult. The same anomalies are found to occur in the nymphæ, which Neubaüer in one case found to be triple, and which depend, too, more frequently on an acquired disease than on a primitive fault of the conformation. They were wanting in the case referred to by Mayer.

CHAPTER II.

INTERNAL ORGANS OF GENERATION.

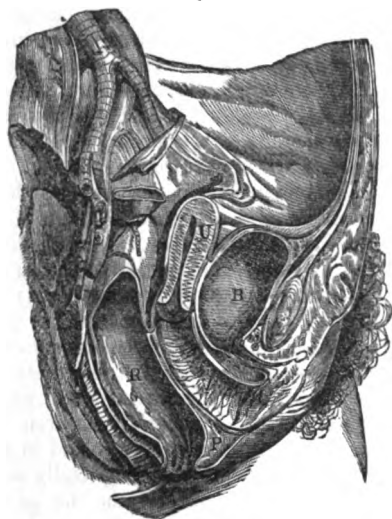
THE internal parts of generation in women consist of the Womb, the Vagina, the Fallopian Tubes, the Ovaries, and the Ligamentous Attachments.

SECT. I.—NORMAL STATE.

ART. I.—THE UTERUS.

The *uterus* or womb is a hollow muscle, destined to lodge and nourish the ovum during pregnancy, and expel it by the process of labor. It is therefore essentially the organ of gestation, and not of generation, as has been erroneously repeated by several authors.

Fig. 10.



A vertical section of the pelvis, showing the organs *in situ*.

B, the bladder, is seen in front, with its urethra passing out under the symphysis. Just behind it, the uterus, U, and the vagina, V, are observed to occupy the middle of the excavation. The rectum, R, is still more posterior, being separated from the vagina by the recto-vaginal septum. P. The perineum.

By reference to the upper part of the figure, the peritoneum can be traced from the anterior abdominal walls to the fundus vesicæ; then down between the bladder and womb, forming a pouch; next over the fundus uteri, and then between the womb and rectum, forming another pouch; and finally to the posterior abdominal walls.

Situated in the pelvic excavation, behind the bladder, in front of the rectum, beneath the small intestines, and continuous below with the vagina, the uterus, in its unimpregnated state, is generally placed in the direction of the axis of the superior strait.

Its shape is that of a pear or a small flattened gourd, or, further, of a truncated

cone, compressed antero-posteriorly, its base being turned upwards, its apex downwards.

For the purpose of explaining the phenomena of pregnancy, the womb is divided into fundus, body, and neck. The *fundus* comprises all that portion that is found above a horizontal line drawn from one Fallopian tube to the other; the body extends from this same line to the contracted portion which marks the commencement of the neck; and the latter, more or less swelled, constitutes the lower portion of the organ.

§ 1. EXTERNAL SURFACE.

The external surface of the womb has been divided into, 1. An *anterior region*, which is slightly convex, its upper half being covered with peritoneum, and the remainder being in contact with the *bas-fond* of the bladder: 2. A *posterior region*, much more convex than the preceding, covered in its whole extent with peritoneum, and separated from the rectum by a space or chink in which the intestines may become strangulated: 3. Three *edges*, one of which, *superior*, convex, and smooth, corresponds to the fundus, and two others, *lateral*, convex on their superior half, and concave below, are lost, as it were, in the broad ligaments: 4. Three *angles*, the first two, *superior* and *lateral*, unite the three edges, and seem to give origin to the tubes, the ligaments of the ovaries, and the round ligaments. The third, *inferior*, far more important than the others—which is the projecting portion of the neck—is seen in the upper part of the vagina, and deserves very special attention.

The inferior angle of the uterus exhibits an orifice resembling a transverse slit, dividing it into two lips, and has received the name of the *tench's mouth* (*os tince*), which Aëtius long ago employed. Burton compared it to the nose of a young dog; in like manner as Mauriceau did nearly a century before. I do not know why Millot, who calls its inferior opening special *orifice* of the womb, gives it the name of *gland*. Of these two lips, the *anterior*, which is thicker and broader than the *posterior*, is also, indeed, somewhat the longer. Nevertheless, as the vagina ascends higher behind than in front, it seems, when a woman is carefully *touched*, that the posterior is longer than the anterior lip. To this peculiarity, doubtless, ought to be attributed the error into which many accoucheurs have fallen, who, not content with asserting that the anterior lip is the shortest, have also represented it as being the thinnest in drawings which in other respects were most carefully made. To convince any one of the proportional length of the two lips of the neck, it is only necessary to separate the womb from the vagina in the dead subject. It will then be seen that the posterior lip is at the same time the thinnest, the narrowest, and the shortest. However, this difference is not to be seen, except in women who have borne children. Levret was certainly mistaken in considering it peculiar to young girls, and in saying that conception causes it to disappear, and that labor elongated especially its posterior lip. Moreover, to agree on this point, we must not confound the neck with the lips. The length of the first behind in no way prevents the anterior edge from being the longest. In virgins the lips are very near to each other, and we can scarcely feel with the finger the line-like slit that separates them. But it may be distinguished, as has been judiciously remarked by M. Dubois, by comparing the sensation produced by touching it, to that experienced by touching the point of the nose with the end of a finger. Sometimes, however, instead of such a narrow slit, we meet with a circular orifice. A modern author has even taken occasion, from this circumstance, to advance the opinion that such is the natural arrangement of the part: but this is evidently an error. M. Désormeaux thinks that this last-mentioned form is particularly to be met with in women who are not apt for fecundation; but this is an opinion which requires to be supported by additional evi-

dence. Besides, we must take care not to confound this circular form with that which is pretty often observed at a certain stage of pregnancy, in women who have borne children before; which it is not always an easy matter, however, to avoid.

Before women become mothers, the lips of the os tincæ are smooth, regular, and pretty firm, although supple; the whole neck terminates in an extremity which is rather *acuminated* than bulging. After one or two confinements, its alit is wider, more uneven; the free extremities of the lips are farther apart; the anterior is elongated, often ends in a point, and exhibits tubercles or bumps, which are also found on the posterior lip, and separated from each other by crevices of greater or less depth, and in greater or less number, chiefly in the left. It is true, however, that this last-mentioned disposition does not demonstrate with mathematical certainty that there have been several pregnancies, for it may be occasioned by disease. It should also be understood that the contrary state persists in some women, after a great many lyings-in. Thus, in a woman in her seventh pregnancy, I have seen the vaginal angle of the womb more regular than in another whom I examined by way of comparison, and who was in her first pregnancy: but in this, as in everything else, we should remember the rule without forgetting the exceptions.

§ 2. INTERNAL SURFACE.

The womb presents an internal surface, which is also called its cavity, and which the accoucheurs divide into superior portion or cavity of the body, and inferior portion or cavity of the neck.

Cavity of the body.—The first of a triangular shape, with sides separated from each other only by a layer of mucus which is more or less thick, sometimes exhibits, on the median line, a sort of *raphé* or crest, which runs through its whole length, and is joined by other oblique or transverse lines. The sides of this cavity, as well as its bottom, are almost straight, sometimes slightly convex in young girls, while they generally remain pretty concave after a lying-in. Its two superior angles are continuous with the origin of the Fallopian tubes, which are sometimes expanded like a funnel, and ought, according to M. Geoffroi St. Hilaire, to be regarded as the rudiment of the *aduterum*, which is remarked in most of the mammiferæ; its inferior angle is called the superior, uterine, or internal orifice of the neck, and is the point by which the two cavities of the womb communicate with each other.

Cavity of the neck.—The cavity of the neck, of an oval shape, is twelve or fifteen lines in length, and five or six lines in width at its widest part, and one or two lines from front to rear. On its two walls, and particularly on the posterior one, are found certain plaits or lines, which have been carefully studied of late by Madame Boivin. This is a sort of gathering, which seems to be only a continuation of that which is found in the womb itself, but much more developed. The median crest, the largest of all, more salient in the middle than at either end, is formed, as it were, by the approximation of many small secondary folds crowded together. The transverse lines are all oblique from above downwards, and from the sides inwards, towards the preceding line, on which they terminate, like the barbs of a feather, on their stem. Slightly concave upwards, they leave pretty deep grooves between each other, in which a good many mucous follicles are to be found, and occasionally some small round transparent vesicles, a sort of hydatids, formerly regarded as germs, and for a long time known as the eggs of Naboth. More deeply seated, that is, beneath this net-work, which constitutes what is called the *arbor vitæ*, there is another, somewhat differently disposed, but which cannot be examined until we come to speak of the structure of the organ. At the place where the two walls of the neck unite, and where the transverse lines, too, are confounded, are also seen two longitudinal lines.

The superior opening of the neck having been above indicated as the *uterine* orifice, it is useless to return again to the consideration of it. The inferior orifice divides the lips of the os tincæ from each other; and as it opens into the vagina, it may very properly be called the vaginal orifice of the womb. From what has been said, and which ought to be understood of the cervix of a young woman, previously to being fecundated, it is evident that the inferior angle of the uterus ought to be quite acute, that a little higher up the size of the neck should be greater, and that this part ought to be again contracted, and, as it were, strangulated at the place where it unites with the body of the organ. As the neck is that part of the uterus which first appears, and as in certain cases it appears more developed than the body, even until after puberty, M. Martin proposed to give it the name *uterum*, and to reserve the term *ad uterum* for the cavity of the womb itself; but this would be making the exception the rule, and besides it is too rare in the adult to merit attention.

§ 3. DIMENSIONS OF THE WOMB.

In women who have never had children, the womb, measured from the most salient point of the fundus to the end of the anterior lip of the neck, I have found to be of an average length of from twenty-six to twenty-eight lines; from one Fallopian tube to the other, from seventeen to twenty lines; from front to rear in the thickest part, nine to eleven lines; at the neck I have found that there were, transversely, ten to twelve lines, five or six lines from front to rear, eight or ten lines across at the place where it is strangulated, and that there were four lines of thickness at the same point. The parietes of the womb are four lines in thickness at the body, and two or three at the neck; the lips project two or three lines into the vagina, and the slit that separates them is of about the same extent.

After several pregnancies, the uterus is from two and a half to three inches in its entire length; twenty to twenty-four lines wide at the fundus, fifteen to sixteen at the widest part of the cervix, twelve to fourteen lines thick at the body, eight to ten at the neck, and each of the walls is six lines in thickness: the vaginal orifice is half as large again as in a virgin.

In the first-named state, the womb weighs from eight to twelve drachms, and in the second about two ounces. It will be seen that these dimensions are very near those given by Roderer; and they are the results of a considerable number of measurements taken on the dead subject.

§ 4. STRUCTURE.

An external membrane, an internal membrane, a peculiar tissue, numerous vessels, nerves, and cellular tissue enter into the composition of the womb.

A. *Peritoneum*.—The *external membrane*, of a serous character, belongs to the peritoneum; posteriorly it descends lower than the cervix, on to the posterior surface of the vagina, while, in front, it is reflected upon the bladder after having invested the anterior surface of the body of the uterus, and before it reaches the cervix. Very closely adherent along the upper edge and median line of the uterus, it becomes less so nearer the sides, and in the neighborhood of the broad ligaments may be easily detached. Observers have not agreed in relation to its thickness, doubtless because it has often been confounded with the layer immediately beneath it, but which in reality ought to be distinguished from it. On the whole, it is thin and very dense.

Sub-peritoneal layer.—This is a kind of doubling which gives to the peritoneal layer a borrowed thickness, covers every part of the uterus, extends itself into the broad ligaments, and is, indeed, only a portion of the common sub-peritoneal fascia, which at this point assumes most of the characters of the yellow fibrous tissue; that is to say, it is elastic, strong, dense, and may be converted into real

muscular tissue, as has been remarked by Madame Boivin, and as I have several times observed myself.

B. Internal membrane.—The existence of the *internal membrane* is not admitted by all anatomists. Gordon, Chaussier, M. Ribes, &c., reject it; the most careful dissections, putrefaction, ebullition, chemical reagents, have all failed in demonstrating its existence to these observers, except towards the close of pregnancy; but at that period it constitutes, according to them, a pellicle of new formation, and not a natural membrane. Bécлар also taught that the internal membrane of the uterus is not a complete mucous membrane, and that it has no epithelium. It is true that, except during pregnancy, we cannot always demonstrate the existence of a uterine mucous membrane, but in several women who died while pregnant, or shortly after delivery, I have succeeded in raising very distinct portions of it. But even could we not succeed in separating it mechanically, analogy would suffice to convince us of its presence; the mucous membranes are exclusively provided with villi; they alone furnish mucus in the healthy state, and muco-purulent matters in a state of disease; it is on their surface that we meet with polypi and sanguine exhalations. Hence, the glairy discharge that occurs during labor, the leucorrhœal discharges, the menstrual function, &c., all prove that the inner surface of the womb performs the same functions, and is subject to the same diseases as the mucous membranes. I conclude, therefore, that, if we can in reality refuse to admit the existence of a membrane, we shall at least be forced to admit that the uterus possesses a mucous surface.

During several weeks, no organ of the fœtus is, properly speaking, invested with a mucous membrane; not one of them can be divided into lamellæ of different natures; they are all formed of a homogeneous tissue; the intestines, like the other hollow organs, are possessed not of internal and external membranes, but of surfaces; it is only at a later period, little by little, and in the same situations where they are observed after birth, that the distinction of tissues, established by zoologists, is effected. Thus, the interior of all the cavities, of all the canals that communicate nearly or remotely with the atmosphere, exhibits the aspect of villous surfaces; but to this fundamental character are added others which differ according to the organ, and reduce every portion into harmony with the uses of the parts it helps to constitute. Sometimes it is a movable lamina, thick and wrinkled, as in the alimentary canal; in other instances, it is a thin smooth layer, difficult to separate from the subjacent tissues, as in the ureters, the vasa deferentia, &c. Although follicular and villous, this element may adhere so intimately to the substance of the organs that it is impossible to separate it; and this is the case with the womb. Nature, true to her great principle, seems here to take pleasure in varying forms without multiplying means; on some points she is content with a mere rudiment, while at other points she at once attains perfection; but, on the other hand, that which, so to speak, she leaves incomplete in the normal state, is rendered complete by disease, or by some eventual condition. In this way it happens that a pregnancy, a polypus, or some other lesion, has, in more than one instance, rendered the mucous membrane of the uterus altogether evident.

C. Peculiar tissue, or parenchyma.—Situated between the two preceding layers, and alone constituting almost the entire essential and fundamental part of the organ, the proper tissue of the womb has been the subject of the researches of a great many very able anatomists. But, in spite of so many exertions, opinions are still far from being unanimous in regard to its nature.

Nature of the peculiar tissue of the womb.—The same thing has taken place in regard to the womb, as always occurs in anatomy whenever the analogies and comparisons which authors are obliged to draw for the purpose of illustrating their ideas are rigorously construed according to the letter. When Vesalius asserted that the womb is a muscle, Walter, taking the muscles of the skeleton, and

even the heart or the intestines as his type, found no difficulty in proving that Vesalius had made a mistake. Although, on the one hand, Malpighi, Ruysch, Noorthwyck, Wrisberg, Meckel, Lobstein, and the major part of modern anatomists, have arranged themselves on the side of Vesalius, we see on the other Böhmer, Blumenbach, Ramsbotham, &c., alleging reasons that are apparently very plausible, to prove that it is at least not founded on the state of the organ when unimpregnated; Denman hazards no opinion on the subject. Both sides have often been right; but, by referring to forced approximations, they have too often lost sight of the object to render it possible to reconcile so many various observations.

Previously to asserting that the womb does or does not contain muscular tissue, it would have been proper to determine what are the characters of that tissue in general; to show that the red color is not essential to it, since it is wanting in the muscles of fishes, reptiles, and even in the muscular coat of the human intestines; and that the same is true of the fibrous appearance, since it is met with in the tendons, aponeuroses, &c., but that it alone enjoys the faculty of contractility, and contains fibrin.

In the second place, it should be considered indispensable to recognize a truth that is too much overlooked in our days: which is, that the fleshy fibre must necessarily pass through several less perfect gradations of development; that in some organs it remains in the rudimental condition, and is developed only by accident. Thus, the trachea and the bronchia, even the arteries of large animals, the elephant among others, evidently exhibit muscular fibres, while the same organs in the human species rarely exhibit them with any distinctness. The gall-bladder, the vesiculæ seminales, &c., are not furnished with them, according to most of the modern anatomists; but let these organs be examined when their coats, strongly hypertrophied, have been long distended, and we shall be soon forced to admit that they possess a muscular coat, as the ancients believed, and as I have seen myself. The womb, previous to puberty, is only a rudimental muscle; when not gravid, its organization, it is true, is but a sketch, but it is only towards the end of pregnancy that we can possibly test its nature. Every circumstance tends to establish that the cellulo-fibrous, elastic yellow tissue which composes the basis of the inter-laminar and inter-spinal ligaments of the vertebræ, constitutes also the web of a very great variety of other organs. It is nowhere more abundant than in the uterus. Hence it appears that this element holds a middle place, and serves in some sort as a passage between the cellular and muscular systems; the chemists have detected fibrin in it, and I have seen it on various points transformed into real contractile tissue. I am scarcely afraid to assert that, wherever it is met with, it may accidentally develop muscular fibres, and that these fibres exist naturally in some zoological species.

In order, therefore, to understand the essence of the uterine tissue, it ought to be studied during its gravid state: then only is it red, contractile, formed of tomentose fibres; then only does it contain a great proportion of the fibrin, and present, in a word, all the characters of the most perfect muscular tissue.

Disposition of the fibres.—Vesalius, Malpighi, and the first anatomists who admitted their existence, contented themselves with saying that the fibres of the womb are so interlaced that it is impossible to trace out their direction. Ruysch and some others advanced that, being principally collected about the fundus of the organ, they compose an orbicular muscle, a sort of disk, the use of which is to detach the placenta at the period of labor; this induced Müller to think there were a certain number of fibres placed near the neck of the uterus for the purpose of counterbalancing the action of the first. This muscle, denied at first by Heister, Smellie, and Walter, is considered by Burton as the origin of the fibres which radiate towards the neck, and by Deleurye as the centre of all the fibres of the womb. It would seem, moreover, that Levet had already had a glimpse of the two orbicular muscles of the uterus, for he said he saw fibres of a spiral form surrounding the tubes. Hunter, Sue, &c., admit that it forms a number of lay-

ers variously crossed; A. Leroy teaches that they give rise to two layers of muscles, one internal and one external; and M. Meckel, who, in common with several German anatomists, partially adopts this sentiment, thinks that each of the two principal layers ought to be divided into several other secondary layers. Baudelocque, and most of the French anatomists, abandoning all hopes of assigning to these fibres a determinate direction, have contented themselves with teaching that they are disposed in loops, parallel to the axis of the uterus, or in horizontal circles, and that the body and fundus of the womb are chiefly composed of the former, while the latter are found more especially in the neck. As we shall see hereafter, the explanation of the effacement of the neck of the uterus during pregnancy, its dilatation at the time of labor, and the determining causes of parturition, all bend on this idea, which originated with Müller. Millot, who gave a very correct description of the two orbicular muscles, admits a third lying across for the purpose of drawing together the sides of the uterus. Indeed, it will be hereafter seen that great stress has latterly been laid on this idea, which is relied on for the explanation of the process by which the cervix is effaced during pregnancy, and dilated in labor, &c., and also the occasional causes of parturition. Lastly, Madame Boivin, to whom we are indebted for some valuable researches on this subject, has observed a much greater number of fleshy layers in the womb than any preceding author. She admits, 1. A longitudinal fascicle, which occupies the median line in front and rear, and extends from the fundus to the neck; 2. On each surface of the organ, and on both sides of the vertical column, three layers of transverse fibres, which proceed to lose themselves, outwards, in the tubes, the ligaments of the ovaries, the round ligaments, and the posterior ligaments; 3. At the superior angles of the uterus, and deeply seated, a circular layer, the centre of which corresponds to the origin of the tubes, and which interlaces and confounds itself with the opposite one; 4. And, lastly, very near the mucous surface, a layer that is thinner than any of the others.

M. Guerin, at the time assistant in my lying-in ward, gave in his thesis some details which, although confirming the results obtained by Madame Boivin, differ sufficiently to compel me to say a few words in relation to them. According to him, the median band having reached the neck, bifurcates in order to cross over the sides to that on the opposite region. Beneath the radiated stratum we find another in which the oblique fibres interlace and form the *raphé* of the median line. Another layer is observed beneath the former; this is composed of semi-circular fibres which constitute the neck, the angles, and form the tubes, at least in a great measure. In fine, M. Guerin says he found fleshy fibres around the vessels.

I have myself dissected a very great number of wombs, at every period of life, both unimpregnated and during the gravid state, and I am convinced that each of these modes of regarding the subject has some foundation. The imbrication noticed by Malpighi and his predecessors is not to be disputed, and does not exclude the existence of the muscle spoken of by Ruysch. This last author, although opposed by Heister, Haller, &c., was almost entirely right. It suffices merely to examine the inner surface of the womb, at the close of pregnancy, to recognize the stratum of muscular fibres he mentions; only, instead of one orbicular disk admitted by the celebrated Dutch anatomist, there are two. The two layers spoken of by A. Leroy, Rosenberger, M. Meckel, &c., are completely apparent in the last month of gestation; but it must not be expected that they can be found independent of each other. The nodulations, the knotty projections or lumps to which A. Petit so often has reference, are also very readily observed in the latter period of pregnancy in a great many wombs. Considered in a general manner, all these peculiarities agree together very well, and further, they agree with the sentiment of those who insist upon it that the womb contains none but fibres arranged in loops or vertically, and in circles or horizontally.

Conclusions.—Upon the whole, the following are what I have most invariably

observed on this subject: 1. Beneath the peritoneum there is a first stratum that is thin, dense, elastic, cellulo-fibrous, and sometimes, but not always, muscular, in which the fibres have no determinate direction; 2. A thicker layer of transverse fibres, which, united in different planes, and imbricated like the constrictor muscles of the pharynx, all tend outwards, and converge towards the four principal points mentioned by Madame Boivin, that is to say, in the direction of the Fallopian tubes, the round ligaments, the ovaries, and posterior ligaments; 3. More deeply seated are found other transverse fibres; but the longitudinal and oblique fibres predominate, especially at the neck, where they constitute the basis of the ridges observed on the inner surface of the organ, and are intermingled with the true circular fibres; 4. Above is seen the pretended *detrusor placentæ* of Ruysch, which seems to be nothing more than an expansion of the circular fibres of the Fallopian tubes, and forms on each side a disk with concentric circles.

The basis of all these strata is the yellow cellulo-fibrous tissue, surcharged with fibrin; the fleshy tissue develops itself in this primitive web as in the intestines; but, inasmuch as the womb seems to be composed by the union of two cylindrical canals, and as it is necessary that it should be endowed with great strength, it is not astonishing that its multiplied fibres should affect the most complex and varied directions.

Blood-vessels.—1. Two orders of arteries are appropriated to the gestative organs: the one, known as the *uterine arteries*, furnished by the hypogastrics, penetrates into the substance of the womb at the cervix; the other, the *ovarian*, given off by the aorta or the emulgents, passes along in the broad ligaments, and after being partly distributed in the ovaries, proceeds to the sides of the body of the womb itself. In ramifying, those of the left side inosculate with those of the right, those from above with those from below; and, as all of them are strongly compressed in the substance of the tissue in which they creep, they are doubled and redoubled a great many times. The veins, distributed in the same manner as the arteries, go to the internal iliac vein from one part, and to the ovarian veins from the other. During pregnancy, these various canals, partially unfolded and largely dilated, run chiefly between the two fleshy strata so much insisted upon by A. Leroy. I have satisfied myself of this not only on the dead body, but also during life, when performing the Cæsarian section in the month of October, 1833, in the presence of MM. Maygrier, Moulin, Halma-Grand, and Bintot. However, I have not yet been able to satisfy myself of the existence of the muscular fibres accorded to them by M. Guérin.

2. The *veins* especially attain so large a size in the substance of the womb during pregnancy as to form enormous canals of three, four, and five lines in diameter, destitute of valves, and covered throughout their external surface with a fleshy tissue. With such an arrangement, absorption of matter contained in the uterus and phlebitis is not at all surprising. Symptoms of this state of things are by no means uncommon among lying-in women.

3. Its *lymphatic vessels* pass into the pelvic and iliac ganglions. Like the veins disposed to become filled with heterogeneous matter and to inflame, they therefore deserve in a pathological point of view some attention. Its nerves come from the sacral plexus, and from the ganglionic system by the renal and hypogastric plexuses. The former are distributed almost exclusively upon the cervix, and it is natural to attribute to them the excessive sensibility enjoyed by this part; while the latter, being here destined to furnish only the vegetative sensibility, must be more regularly distributed to all parts of the womb.

ART. II.—THE FALLOPIAN TUBES.

The *uterine tubes*, or Fallopian tubes (*seminiferous ducts*), are two small, hollow cylinders, four or five inches long, as large as the barrel of a quill, and ex-

tending from the lateral angles of the womb, with which they are continuous, to near the iliac fossæ, where they terminate in a lacinated and loose extremity, called the devil's bit (*morris diaboli*), or *fimbriated extremity* of the tube. This tortuous tube is enclosed in the upper edge of the broad ligament; its cavity, which, at the womb, is large enough to admit of a middle-sized probe, at first contracts by degrees, so that near its middle a bristle can scarcely be passed through it; it then enlarges, and soon acquires a diameter of two or three lines. Among the fringes which terminates its loose extremity, is one that is harder and longer than the rest, which fixes itself to the ovary, and seems to be the real continuation of the tube.

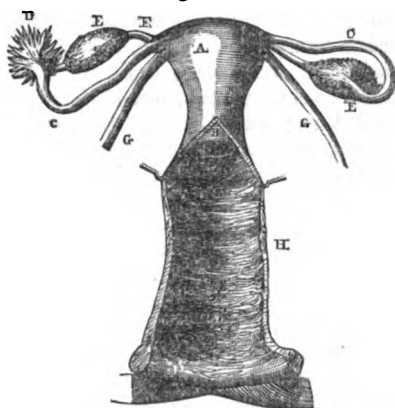
The *composition* of the seminiferous tubes is in all respects similar to that of the uterus itself. They are enveloped externally by the peritoneum, which adheres closely to them, and a mucous membrane, folded in the direction of their length, lines them within. A pretty thin layer of fleshy fibres is found betwixt these two laminæ. Its fibres are of two sorts, just as in the small intestines: one sort, longitudinal, are only a prolongation of the transverse stratum of the surface and fundus of the uterus; the others, which are circular, cut the former at right angles, and seem to be appendages of the orbicular muscle of Ruysch. As to the internal coat, its existence has been denied; but to the proofs related above I may add that, in a woman of middle age, I and M. Baudelocque, jun., saw the mucous membrane of the Fallopian tube as movable, and as easily separable, as it is in the œsophagus; its valvular folds, mentioned by those authors who assert that the ovule may easily pass to the womb, but cannot possibly retrograde towards the ovary, and especially that the *semen masculinum* cannot pass through the tube, have been the products only of the imagination of those who needed them for the defence of their preconceived theories. The tubes receive all their vessels from the ovarian branches; their nerves belong to the great sympathetic, and, like the uterus, their basis is an elastic, fibrous, cellular tissue.

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ART. III.—THE OVARIES.

The *ovaries*, long known as the *testes muliebres*, and which may be called the female *seminal glands*, are situated in the upper part of the broad ligaments, behind, and a little below the tubes, near the superior angles of the uterus, to which they are attached by the *ligament of the ovary*. Oblong, slightly flattened from front to rear, being of the size and almost of the shape of an almond or a large bean, the ovaries have a superior, convex, and loose edge, while their inferior edge is straight, receives vessels, and proceeds to join the ovarian fringe of the tube. Their surface even, or scarcely botryoidal in women who have never been fecundated, presents, on the contrary, in those who have had children, inequalities, fissures, and reliefs in a greater or less degree. Differing as much both in appearance and nature from the salivary glands to which Péan

Fig. 11.



The internal genital organs.

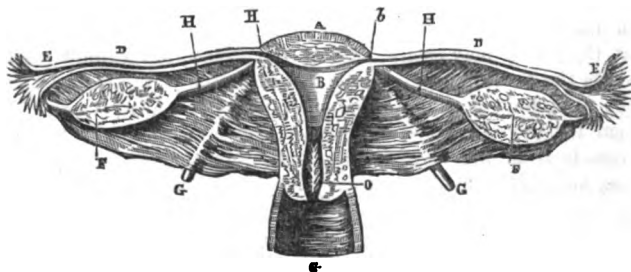
A. The uterus seen on its anterior surface. B. The intro-vaginal portion of the neck of the uterus. C. The Fallopian tubes. D. The pavilion, or the fimbriated extremity of the tube. E, E. The ovaries. F. The ligament of the ovary. G, G. The round ligaments. H. The vagina laid open.

On the right, the fimbriated extremity of the tube is seen applied to the ovary.

compared them, as they do from the seminal glands of the male, the ovaries possess a structure which is peculiar to themselves, as is the case in all the special organs. A sort of parenchyma of a reddish-gray color, composed of lamellæ and filaments variously interlaced, constitute their principal tissue. Since the time of R. de Graaf, it is admitted that there really do exist in this parenchyma certain transparent vesicles, from twelve to twenty in number, and which are denominated ovules or germs. In it also we occasionally meet with accidental vesicles, true hydatids, which should not be confounded with the former, but which may possibly be only degenerated ovules. According to De Graaf, "vessels and preparative nerves enter into these vesicles, on the tunics of which several of their branches, after various divarications, distribute themselves, as occurs in the yolk of the egg while it is still attached to its ovary." A strong, thick, and very tough membrane serves as the shell or envelop of this tissue; and according to my observations, this fibrous membrane is only an appendage of the ligament of the ovary; that is to say, the ligament of the ovary, which is one or two inches in length, and one or two lines thick, is formed by a fascicle, from the transverse layer of the posterior surface of the uterus, and when it reaches the point of the seminal gland, its fibres separate in order to envelop the parenchyma in question. It is evident that the *proper* tunic of the ovary is altogether distinct from the peritoneal layer, from which, however, it is impossible to separate it. In naming it *dartos*, it is probable that the ancients did not suppose that, like the *dartos* of the male, it approaches by its nature very nearly to the contractile or muscular tissue.

Until the time of Fallopius, it was generally taught that the germ was carried from the ovary to the uterus by different canals, of which the tube did not constitute any part; the ligament of the ovary was supposed to be the principal one; it formed the deferent canal. Warthon and Mauriceau admitted one or two others, which passed from the edge of the ovarium and opened into the vagina; but it was long ago demonstrated that the ligamentous cord of the ovary is solid, and contains no canal; however, the other passage, also forgotten for a whole age, has just been recalled to the attention of naturalists by M. Gartner, of Copenha-

Fig. 12.



Cavity of the uterus and the Fallopian tubes.

A. The superior border or fundus of the womb. B. The cavity of the womb. C. The cavity of the neck of the uterus. D. The canal of the Fallopian tube cut open. E. The fimbriated extremity, or pavilion likewise laid open. F, F. The ovaries, one-half of which has been removed so as to bring into view several of the Graafian vesicles. G. The cavity of the vagina. H, H. The ligaments of the ovary. G, G. The round ligaments.

gen, who looks upon it as an organ that is always to be met with in the large quadrupeds. I have vainly sought for it in the human subject, and found nothing even remotely resembling it. The ovary is the essential organ of generation, the organ in which germs are formed.

ART. IV.—THE LIGAMENTS.

In investing the internal organs of generation, the peritoneum gives birth to several ligamentous folds, which it is proper now to describe.

§ 1. BROAD LIGAMENTS.

Of these, the chief are the broad ligaments, which constitute a transverse partition, and divide the whole depth of the pelvis into two cavities, one anterior and the other posterior; in the former the bladder is situated, and in the latter, which is deeper, is found the rectum. The two laminae of the peritoneum, of which the broad ligaments are composed, separate when they reach the sides of the womb, in order to spread out on its surfaces; downwards and outwardly, they also deploy so as to be continuous with the peritoneum which lines the cavity of the pelvis. Their superior border, which is loose, extending from the angles of the uterus to the iliac fossa, is divided, as it were, into two or three secondary folds, which are called its lesser wings; one of these, the posterior, encloses the ovary and its ligaments; another (the middle one, according to M. Dubois and the other authors who admit three of them; but the anterior one, according to Baudelocque, M. Désormeaux, and all the accoucheurs who contend that there are only two) contains the Fallopian tube, and is the highest; the third, mentioned by some, and rejected by others, and which is in fact scarcely distinguishable in the natural state, is found in front of, and lower down than either of the preceding ones, and encloses the round ligament. The two serous laminae of the broad ligament are not in immediate contact; they are separated by a layer of cellular tissue, of various thickness in different individuals, and this layer, which downwards and outwards becomes blended with the sub-peritoneal cellular tissue, or the *fascia propria* of the pelvis and iliac fossae, is sometimes found to contain muscular fibres; so that we find, in the broad ligament, nearly the same elements as in the womb itself.

§ 2. ROUND LIGAMENTS.

The *round ligaments* or *sur-pubic cords*, fibrous bundles, which take their rise in front of and a little below the Fallopian tubes, follow the outline of the anterior semi-circumference of the superior strait, and proceed, after passing through the inguinal rings, to terminate in the groins and mons Veneris, are the only ones which have been deemed, with the broad ligaments, worthy of attention. Formed of reddish and wavy fibres, which rise from the anterior and middle transverse layers of the womb, the round ligaments are evidently of a muscular nature. Dionis asserted that the use of the round ligaments was to depress the os tincæ by contracting during the sexual embrace, and thus to bring it closer to the male organ; but, as their origins are lower than their insertions, it is manifest that their contraction in that case would produce a rather contrary effect. But further, the womb without them would be always retroverted by the bladder, which is repeatedly distended with urine in the course of every twenty-four hours; they also uphold it until towards the middle of pregnancy. Ould, who considered them a mass of vessels, was evidently mistaken when he said that they prevented the uterus from pressing on the rectum; but further than this nothing is certainly known in regard to their uses, and there is no occasion for me to enter into an argument against the opinion of the ancients, especially of Spigelius, who supposed that the semen passed through them in its passage to the clitoris. Being put on the stretch by the ascent of the womb, it is possible that they may, when the woman is on foot, and particularly when on her knees, occasion pretty smart pains in the groins and thighs.*

* It is very common for women laboring under prolapsus uteri to complain of pain and

§ 3. OTHER LIGAMENTS.

Douglass, Sue, and Madame Boivin have noticed four other ligaments, two anterior and two posterior (*utero-sacral*); the two former, very small in most women, passing from the sides of the cervix uteri to the lateral parts of the bas-fond of the bladder, are occasionally composed, in addition to their peritoneal coat, of a few fleshy fibres that seem to be detached from the antero-inferior transverse layer of the neck of the womb. The latter, which are very well described by Petit, and called by Deleurye posterior round ligaments, and which are much stronger and more constantly observed, originate a little lower down, from the posterior surface of the cervix, run backwards, each forming a crescent, the concavity of which looks towards the median line, and are attached to the sides of the rectum, where they are lost in the cellular tissue and peritoneum which invest the front of the sacrum. From numerous facts that have come under my notice, I am of the opinion that they are of the same nature as the round ligaments, and that their fleshy fibres are furnished by the postero-inferior transverse layer of the uterus; consequently, it may be conceived that they may tend to prevent the retroversion of the womb, and be in this respect congeners of the round ligaments; that their use is to prevent the os tinæ from being carried forwards; and that the knowledge of them is far from being unimportant to the accoucheur. We will perceive that a modern writer, M. Ritgen, has made them the seat of a chronic disease frequently very serious among lying-in women.

ART. V.—THE VAGINA.

The *vagina*, or vulvo-uterine canal, an organ for eduction and copulation, is a cylindrical canal, four or five inches long by about an inch in diameter, which extends from the vulva, where it is continuous with the labia and hymen, up to the neck of the uterus, to whose circumference it is attached. Its direction is nearly parallel to that of the posterior wall of the excavation; that is to say, it is concave in front, and convex posteriorly, is situated in the axis of the inferior strait, and forms an angle of about sixty-five degrees with the great diameter of the womb. From this disposition, it happens that its posterior wall is much longer than the anterior, and its two extremities, being inclined towards each other in front, represent pretty correctly the planes of the two straits of the pelvis. I am of the opinion of Smellie, that the opening of the vulva is not at the centre of the strait. The anus, being somewhat nearer the pubes than the coccyx, causes at once a very considerable distance between the posterior wall of the vagina and the end of the rectum.

Connections.—The posterior region of its external surface, resting for the middle three-fifths of its whole extent on the fore part of the rectum, assists in forming the recto-vaginal septum; in approaching the vulva, its lower fifth leaves the rectum, at a distance equal to the whole thickness of the perineum; its superior fifth, loose in the pelvis, is invested by the peritoneum. Its anterior region is connected, by means of a dense and firm cellular tissue, first to the bas-fond of the bladder, so as to form the vesico-vaginal septum; then to the urethra, which gives rise to the urethro-vaginal septum. The sides of the vagina are surrounded with vessels, nerves, and a very abundant cellular tela.

The *interior* of the vagina presents a number of wrinkles or folds, analogous to those which are met with in the cavity of the cervix; the middle column of its parietes, sometimes divided into two, three, or four small parallel columns, increases in thickness as we approach nearer to the vulva; the same is true of the transverse folds; so that the vagina, which is smooth, or almost smooth above,

soreness in the regions traversed by the cords. I am accustomed to the prescription of leeches for these regions, in many cases of uterine disease—as I consider that blood taken from capillaries here, actually effects depletion of the vessels of the uterine circulation.—M.

is most commonly rugose and plaited below, like the palate in the ruminating animals. I have already stated, that below the meatus urinarius and at the fourchette, these two middle columns constitute the anterior and posterior myrtiform caruncles. Larger in young persons who have never cohabited, and in brunettes with a dry fibre, than in women who are in an opposite condition, all these wrinkles are effaced during labor, but in general reappear soon afterwards.

The vaginal cavity terminates above in a circular groove, or cul-de-sac, much deeper behind than in front. Supple, thin, and situated between organs liable to alternate dilatation and contraction, the sides of the vagina are habitually in almost complete contact; but as they are endowed with great extensibility, it happens that the capacity of the vulvo-uterine canal varies considerably. Sometimes it is found to be wider at its middle than anywhere else, and that is because the womb is too much depressed; at other times, it is only the superior portion, especially in women who have had children, that is found dilated as it were, which depends on the neck of the uterus having remained after delivery lower than it was before marriage. In fine, we shall hardly find it of equal dimensions throughout, except in those who have scarcely ever, as yet, yielded themselves up to venereal enjoyments.

Structure.—Two layers enter into its composition. One, *external*, a real prolongation of the external laminae of the uterus, has, for its basis, the yellow cellulo-fibrous tissue, and contains a small number of interlaced, very pale muscular fibres, which must not be confounded with the elliptical muscular rings of its vulvar orifice, and which belongs to the constrictor vaginæ muscle. These latter, indeed, act under obedience to the will; the former, on the contrary, are not brought into play except by the gratifications of love. Arteries, and more especially numerous veins, pass through this tissue, and form, particularly below, a real spongy or erectile stratum, which swells under the friction of coition, and may then contract so much as manifestly to diminish the width of the vagina. A case reported by M. Halma-Grand would even induce one to believe that in certain cases the vagina becomes contracted to such a degree as to benumb the hand of the accoucheur during labor.

The other, *internal*, is continuous with the mucous membrane of the vulva, and is blended, on the lips of the cervix, with that which lines the cavity of the womb; that half which is nearest the pudendum presents all the characters of the most perfect mucous laminae; in it are found an epithelium, follicles, villi, &c. Near the neck it cannot be separated from the subjacent tissues, and at that point nothing demonstrates the existence of follicles and villi. It covers all the duplicatures of the vagina, but does not compose them, whatever may have been said to the contrary by a crowd of authors. The mucous follicles are principally seated at the bottom of these folds, where also the venereal chancre is found to be occasionally concealed.

Two small glands noticed from time immemorial by the anatomists, under the name of *vaginal glands*, or *prostates* of Bartholini, and which have been erroneously classed among the simple follicles, are to be seen under the lateral myrtiform caruncles, betwixt the mucous membrane and the muscular coat. Their uses are little understood. However, Smellie, who describes their lacunæ or orifices on the sides of the meatus, says that, during coition, they emit a fluid; and M. Gartner thinks they may serve as the point of origin or termination of the canal discovered by him.

CHAPTER III.

SEXUAL ORGANS IN GENERAL.

THE sexual organs, taken as a whole, and regarded in a philosophical light, may be considered as a dependency of the tegumentary laminae; that is to say, the mucous membrane constitutes the [most important and constantly present portion of them. In the lower animals, as well as in those whose sexual system is in the highest degree complex, the germs are always created at the bottom of a mucous cavity, whether it consists of a simple excavation, or constitutes a canal that is straight, tortuous, &c. However, the generative cavity is sometimes composed of a doubled homogeneous lamina, of equal thickness throughout its whole extent, as in worms, and the species that have no uterus; sometimes, on the contrary, this duplicature is at first very thin in one portion of its extent, becomes in the next place very thick at another point, and gradually becomes thin again in a third, as is the case in women.

Although, in the human species, the generative apparatus forms, as it does in brutes, only along a canal reaching from the ovary to the vulva, it exhibits to us, nevertheless, one of the most perfect of the secretory apparatuses. The ovaries constitute its glandular portion, the uterus is the reservoir, and the vagina the excretory duct; so that they may, in respect to their peculiar functions, be divided into formative, productive, and transmitting organs (*the ovaria and tubes*), into the gestative organ (*the womb*), and into educative, conjunctive, or copulative organs (*the vagina and vulva*).

Careful dissections of most of the large animals confirm what I have now advanced touching the nature of the peculiar tissue of the sexual organs of the human female. The muscular fibres are very evidently seen in the uterine horns of the cow, the mare, &c., where they affect the same arrangement as in the small intestines; the same is true of the cervix, where their direction is chiefly transverse, and of the broad ligaments, where they constitute several distinct bundles.

In the early periods of uterine life, the ovary, very large, and particularly very much elongated, forms a sort of yellowish sac, which is uninterruptedly continuous with the Fallopian tube, as in fishes. Very small in proportion, very slender, and almost lost in the middle of the broad ligaments, the uterus is thicker the nearer we come to the vagina, above which it terminates by a neck that is soft, very projecting, and of a considerable size. At the ninth month, the vagina is very long, and wide enough to admit of the introduction of the finger; its mucous membrane, as well as that of the cervix, is very evident; but the body of the womb is so firm that it would be difficult to separate its different tissues. From birth to puberty the genital organs of the young girl undergo no special change; nothing in them discloses the great part they are destined at some period to play in the economy, and they merely follow in their evolution the progress of that of the constitution. At the age of from twelve to eighteen years, they awake from their long stupor. The womb rapidly attains to double the size it had previously acquired, both in breadth and thickness; the base of the wedge, which it resembles, instead of remaining low down, rises higher up, and thenceforth the woman commences a new era. Although not so marked, yet the changes that take place in the ovaries and Fallopian tubes are not the less undeniable.

As long as a woman has had no children, the genital organs remain in this state. After one or more pregnancies, the ovaria become covered with protuberances, wrinkles, or cicatrices, and they still increase a little in size. The tubes, almost strangers to the great revolution operated in the general system, scarcely differ from their condition previously to the first pregnancy, or from what they will be at a ripe age, unless affected by diseases, of which they often become the seat. The form and proportions of the uterus remain unaltered, only it continues of a rather increased size. The vagina becomes shorter and wider, while the strength of the round ligaments is more or less augmented. In old age the ovaria are atrophied, become elongated, and of a very irregular shape; the womb tends again back to its original size; the cavity of its body becomes so contracted that the stricture which connects it with the neck is sometimes found to close it completely up, as has been very judiciously indicated by M. Mayer, and as I have often observed.

SECT. I.—ABNORMAL STATE.

The anomalous conditions of the sexual apparatus, which are as numerous as they are diversified, all seem to depend upon a want, an arrest, or an aberration of development, or on a disease occurring anteriorly or posteriorly to the period of birth.

ART. I.—APPENDAGES.

No authentic case exists of a complete and simultaneous absence of all the internal female organs of generation.

§ 1. OVARIES.

Chaussier has made mention of a person who had only one ovary, one tube, and, so to speak, only one-half the uterus. M. Vidal has since exhibited a case of the kind to the Anatomical Society.

The absence of the ovaria has been ascertained, in more than one instance, although the other parts of generation were in a natural state; only one was absent in the case mentioned by M. Jadelot.

M. Renaudin has seen them reduced to the smallest possible size in a woman about forty years of age; the Graafian vesicles may fail to become developed in them, and that necessarily occasions sterility.

The ovaries may escape from the pelvis through the openings at the groin, descend into the upper part of the labia majora, or pass to the side opposite that they ought to occupy, and become entangled with the tubes in such a manner as to be with difficulty extricated, as in a case that fell under my own notice.

§ 2. FALLOPIAN TUBES.

The tubes are rarely found wanting, nor do they often deviate from their ordinary direction; but they occasionally become accidentally closed, sometimes near the ovary, and at others at a point nearer to the uterus—as is seen in the case reported by Meyer, or that of M. Reynaud, and in a specimen I examined at La Pitie in the month of March, 1833.

ART. II.—THE UTERUS.

M. Renaudin gives a very remarkable case of absence of the uterus: the cervix alone existed in a rudimental state. This fact is confirmatory of those previously reported by Held, Theden, Engel, Lieutaud, M. Caillot, and of the one recently made public by M. Breschet. The greater part of these examples, however, are very unsatisfactory. Almost all were met with in women who had been examined only during life; they should not, however, be altogether called in question.

The uterus was most decidedly wanting in a woman examined by Meyer, and who died from a gunshot wound. The same thing was observed in the little girl of whom Rault speaks; and a simple tubercle filled its place in a subject Dance dissected. There was an entire absence of it in a patient operated on by Macfarlane, and I have seen it reduced to a cellular cord in a young girl of nineteen years of age.

§ 1. DOUBLE UTERUS.

Sometimes the womb is very much elongated, as in the monkey; it is oftener found divided into two equal or unequal portions, either partially or completely, internally or only externally, and sometimes on both surfaces at once.

Sometimes there is a sort of accidental sac superadded to the natural organ, into which it opens, as in the case related by Dionis; or, on the contrary, with which it has no communication, as in the example given by Canestrini.

Most generally, the division is at the median line, either externally and at the fundus, as in one instance furnished in the Leipsic "Commentaries," and another related by Eisenmann—or on the posterior surface, as in Morgagni's case—or on the fundus and both surfaces at the same time; and then the womb, really two-horned, resembles more or less that of the quadrupeds.

Sometimes the division comprises only the superior part of the organ, which at other times is separated quite down into two portions; sometimes the two horns unite at an acute angle, and touch at their corresponding surfaces; in other cases, they affect a transverse position, and only unite at the upper end of the vagina, so as to form the cervix.

Internally, the septum is also far from being always of the same magnitude. At times it is only a little spur that divides the fundus of the uterine cavity into two sinuses, as in the example cited by Eisenmann. In the specimen deposited at the Museum of the Faculty by M. Dupuytren, it is simply represented by a double median crest, attributable to an hypertrophy of the natural vertical columns of the cavities of the body and cervix. This septum may stop at the superior part of the cervix uteri, or descend as low as into the vagina; it may be complete, and divide the womb into two perfectly distinct cavities, or may be pierced in some portion of its length, and allow one of the cavities to communicate freely with the other. The neck itself may be single, as in the instances related by Bauhin, Sylvius, Riolan, Celti, Purcell, Marquet, Ferlan, Tiedemann, Cruveilhier, Madame Boivin; or double, as in the cases of Gravel, May, Madame De la Marche, Cruger, Bartholin, Haller, Littre, Lauth, De Tressan, Eisenmann, Callisen, Böhmer, Tiedemann, MM. Lallemand, Dupuytren, Duméril, Dubois, West, Cassan, Récamier, Garnier, and Ollivier D'Angers—in a case that I saw in a womb, the account of which was recently published by A. Bérard—and in two which I have observed, and in another presented to the Academy by M. Moreau.

The cases of double uteri are, moreover, so frequent, that new examples are met with every year. Dance has mentioned several of them. MM. Jolly, Lermnier, and Giraldès have lately added some more to the foregoing, and to the two reported by Diemberbroeck. Millot says he met with two, but in the living. In Waller's case, there was impregnation, and the membrana caduca was found in the second horn.

In all these cases, the uterine orifices opened into a simple or double vagina, according to circumstances; but in a subject dissected by Saviard and Duverney, one of them opened into the rectum, while the other maintained its natural disposition. A similar case may be found in the works of Valisnieri. At any rate, whether the os tincæ be simple or compound, whether it be the termination of a two-horned womb, or of one of a perfectly natural form, it is not extremely uncommon to see it terminate in the rectum, the bladder, or urethra, or even in the hypogastrium, above the pubis.

Is it now necessary to remark that the question so long debated, as to double uteri, resolves itself into a mere logomachy? If by double uterus we are to understand the simultaneous existence of two wombs, each possessed of two tubes and two ovaries, it is clear that none such have been met with; if, on the contrary, to constitute this condition it is only necessary to have a more or less complete division of the natural uterus into two equal or unequal parts, each one having its own tube, ovary, cavity, and cervix, there are too many examples, it is an anomaly too often observed, and too easy to be explained according to the laws of the animal economy, to permit us to entertain the shadow of a doubt about it at the present day.

§ 2. VARIOUS ANOMALIES.

The gestative organ is subject to other irregularities.

A. *Abnormal canal*.—M. Baudelocque discovered, and had a drawing made of a preternatural canal, which extended from the right tube to the cavity of the neck, passing in the substance of the parietes of the womb. Madame Boivin also makes mention of a kind of irregular canal which seemed to form a communication betwixt the ovary and the superior part of the vagina; and perhaps there is no great difference between this anomaly and the canal mentioned by M. Gartner.

B. Several authors have spoken of wombs obliterated either wholly or in part; either by a primitive faultiness of the development, or accidentally. Without admitting as conclusive all the cases which have been reported, I must confess that I have seen many instances of them in old females, and that M. Deschamps, *interne* at the Salpêtrière, showed me, in November, 1833, a specimen in which this condition was produced by numerous fibrous tumors scarcely developed. The occlusion of the cervix, or rather the vaginal orifice of the womb, has often attracted the attention of accoucheurs. Amand some time ago reported an example of it. That of Morgagni is most perfect; and those reported by Dance do not admit the possibility of a doubt. Nor is it the less true that most of those reported as interfering with delivery, are invented, as we shall see hereafter. Occlusion of the os uteri prevents fecundation and not the escape of the foetus, unless it is affected during pregnancy. Lauverjat and Denman appear to have maintained this opinion some time.

The cervix uteri may present a considerable length and size, as in the remarkable cases cited by Morgagni, Levret, Bichat, MM. Lallemand, Segard, Gardien, Flamant, &c.; and its position may be deranged by preternatural adhesions, which fix one of its faces or edges too near the margin of the pelvis, either in front, on one side, or backwards. Deleurye says it may descend as far as the vulva, and Dance published some cases like those of M. Lallemand, and those which the celebrated Malaure presented to Saviard more than a century ago.

Its inclination backwards or laterally in consequence of adhesion is not at all unusual, as I have myself met with five cases in which it was so considerable as to render fecundation impossible.

If such observations were good for nothing but to satisfy an idle curiosity, I should not have dwelt so long on them; but many of them are closely concerned with the practice of tokology; others explain several phenomena, of which it would be otherwise difficult to give any account. Sterility, several kinds of extra-uterine pregnancy, superfetation, retention of the menses, fecundation through the urethra, fecundation and delivery through the anus, and want of menstruation, are cases in point. When the womb is double, if the woman becomes pregnant in one side only, and there are, meanwhile, two orifices, quite separate from each other in the vagina, two different persons, although equally learned, may establish a very different diagnosis, even during labor. Two distinguished physicians, says Tiedemann, met together to see a woman who supposed herself on

the point of lying in; having touched her, one declared that the neck was in the natural state; the other found it dilated, and said that the head was engaged. Another examination showed them that the neck was double. M. West laid before the Academy of Medicine a very similar case, collected at the *Maternité* of Paris: at the commencement of the labor, one of the pupils not only thought that dilatation had not begun, but that the neck was not quite effaced; the other found it dilated nearly one inch; the woman having died in labor, a post-mortem examination showed the reason of this difference of opinion; the womb, which was double, terminated by a double os tincæ in the vagina.

If by imagining laws we could compel nature to obey them, I should be content to say, with Tiedemann and Meckel, that a majority of the irregular conformations of the genitalia are only instances of a persistence of their primitive, but natural state of organization; that the uterus bicornis, for example, depends upon this, that the two half cylinders, which are said to constitute its first rudiments, have disobeyed the laws of conjunction discovered by M. Serres; but, unfortunately it happens in this as in most other cases, the motives and the causes escape our research, and these brilliant conceptions have but one fault, and that is, they do not agree with actual observation. I am bold to affirm, from numerous researches, that the womb and vagina in reality present, from their very first appearance, the same form, and the same general characters, as those they possess after their complete development.

ART. III.—THE VAGINA.

Vicious conformations of the vagina are not less frequent than those of the womb.

Its total absence is pretty common. MM. Boyer, Caillot, Willaume, A. Bé-rard, and an infinity of others, have seen it terminate in a *cul-de-sac* above the vulva, and not open externally at all. In some cases its vulvar opening exists, but is obliterated above, and does not extend to the uterus, as Flamant appears to have observed. All the students of the school of Paris may have seen a woman of this conformation a few months since in the wards of the Hôtel Dieu, where she died after an operation for fistula in ano.

I have observed a similar disposition in a woman of about thirty years of age, who had been delivered of a child five years previously, and had not had her menses since that period.* A cook aged twenty years and upwards, robust and perfectly well formed in every other respect, presented the same arrangement, at La Pitié, in the month of October, 1833. In the case of imperforation, of which F. de Hilden speaks, the menses passed from the nose, and the woman was un-

* I have now a patient under my care who is about 19 years of age. The external organs are well formed, the pudendum being covered with hair as in a healthy individual. Upon separating the labia, it is found that there is no vagina. A shallow *cul-de-sac* is all that exists at the bottom of the vulva. A style in the urethra and a finger in the rectum enable me to know that no vagina is interposed between the rectum and the urethra. The uterus, or what is supposed to be the uterus, is so large as to occupy the whole excavation, and to be felt two inches above the brim of the pelvis by a hand externally applied. The patient has suffered for several years from monthly attacks of the most violent pain, which is only to be mitigated by large anodyne doses. Hoping to find a portion of vagina attached to the cervix, Dr. Randolph, by means of horizontal strokes of a bistoury, effected an opening which was large enough to receive the thumb, and at least $3\frac{1}{2}$ inches in depth—yet no vagina was discovered, nor could we learn where the cervix uteri was placed. This artificial vagina was kept dilated with a golden bougie, which at last was abandoned on account of the pain and irritation it caused. The distress of the patient increased *pari passu* with the monthly growth of the pelvic tumor, which we supposed to be the womb filled with menstrual blood, and hermetically enclosed. As a last resource, it was determined to tap the womb, and accordingly Dr. Randolph, with great precaution, pushed the point of a curved trocar at least $2\frac{1}{2}$ inches in a direction perpendicular to the surface of the tumor. No fluid

willing to be operated upon. The coarctation of the vagina, which Paré calls phimosi, must also be of frequent occurrence, for an infinity of causes may give rise to it. On this subject we can refer to the cases related by Lauverjat. Péu, M. Segalas, M. Keates, and M. Barbotin have observed it as the consequence of difficult labors.

In the woman observed by M. Lisfranc, the accident arose from old syphilitic ulcerations. In M. Lombard's case, an injection of sulphuric acid was introduced into the vagina. A burn or long-continued suppuration may produce it. I have observed it in a young lady in consequence of a long-continued leucorrhœal discharge.

In M. Sue's case, the rectum opened into the vagina, and the vagina into the bladder. Nevertheless, the vulvo-uterine passage may open into the urinary bladder, without the bowel being at all deviated from its natural course, as is proved in the cases related by Maret, Palfin, and Cassan. The vagina is more frequently found to terminate in the rectum at various distances from the anus.

The septum which divides it is pretty often composed either of a simple frænum, connate or accidental, situated transversely, or parallel to its axis, near the vulva, or cervix, or towards the middle of the canal; or, of a valvular fold, more or less strong; or, of a real diaphragm. I have observed all these differences both in the living and dead subject. This septum may give to the vagina the appearance of two united cylindrical canals, each having a hymen, as occurred twice to Callisen and once to Eisenmann, or a single external opening, as noticed by Bartholin and Haller; sometimes it exists only above and below, and allows the two vaginæ to communicate with each other, about their middle or near the neck; most frequently, as remarked by Majocchi, Bœhmer, Cassan, &c., it does not reach to the vulva; and, further, it is in general only the continuation of a similar disposition of the womb.

§ 1. METHODS OF OPERATING.

Occlusion, absence, or excessive coarctation of the vagina, moreover, interfere very considerably with the sexual embrace, so much so as to require several kinds of operation for their relief. In a case where the contraction was so great as to prevent connection, the woman became pregnant notwithstanding; and Deleurye states that Puzos saw a case of the same kind. It was the same in the woman of whom Denman speaks, and who, imperforate from a previous confinement, attributed her condition to the persistence of the hymen; then again in the one mentioned by Amand, as well as in the cases described by Guillemot and Hare. This state of things frequently requires the aid of a surgeon during gestation or at the period of delivery; we shall, therefore, be obliged to return to it under the article *Dystocia*.

Irregularity or simple retention of the catamenia may occur at any period, except during pregnancy. The impossibility of coition alone would justify the employment of the means of art in such cases, particularly if the woman be still young. So long as the occlusion is incomplete, or is produced by a simple membrane, and the operation confined to dilatation, or a few incisions, it is neither difficult nor dangerous. But in cases of perfect obliteration or absence of the vulvo-uterine canal, it is very different. For then, indeed, there is danger of opening the bladder, as the cases reported by MM. Mondat and Lombard show. The possibility of an operation being successful, if followed out by a careful dis-

followed the puncture. The patient had a slight fever afterwards, from which she recovered in a few days. Such is the lamentable situation of this young and estimable girl. The agonies she endures at each menstrual period are pitiable.

For a case of atresia vaginæ in which the womb was tapped, a remarkably successful operation performed by Dr. Randolph, see the *Phil. Prac. of Midwifery*, by C. D. Meigs, p. 360.—M.

section, has been clearly proved by the cases of Physick, Flamant, Willaume, Renauldin, and Amussat. There is, however, a condition where every attempt of the kind should be forbidden, that is, where there is no sign of a uterus. Here there could be no object for an operation, and I cannot understand how Macfarlane, whose patient died, could have decided upon it. With a sound in the bladder, or one hand on the hypogastrium, whilst the index finger of the other explores the rectum, we can always satisfy ourselves of the existence of the organ. The woman of whom I have previously spoken seemed to be, apparently, a proper subject to operate upon. She strongly urged it, and the vagina, terminating in a cul-de-sac of an inch in depth, was sufficiently large and yielding to allow the introduction of instruments; but, on an attentive examination of the parts, I was satisfied that, if the uterus existed in her case, it was most probably in a rudimentary state. I was therefore unwilling to subject her to any operation, more particularly as she enjoyed excellent health, and as pain in the loins, accompanied with some colic every month, was the only inconvenience she experienced.

ART. IV.—HERMAPHRODITISM.

A being in whom two sexes are united is called an *hermaphrodite*; this name, according to fable, is derived from Hermaphrodite, the son of Mercury and Venus, who was condemned by the gods to unite his body to that of Salmacis for having despised the charms of that nymph. Often debated in the courts of justice in times past, and by the physiologists of all ages, the question of hermaphroditism or androgyny, almost wholly abandoned towards the close of the last century, seems on the point of coming up again to divide the opinions of the learned.

In the monœcious plants, in zoophytes, and various mollusca, such as the oyster and snail, the two germs are found to exist in the same individual; but the sexes are observed to be separate in the dioecious vegetables, and in the animal kingdom, in worms, insects, and also in fishes, reptiles, birds, and mammiferous animals. So that hermaphroditism in the human species is, at least to all appearance, contrary to those laws that preside over the grand distinctions of living beings.

Notwithstanding this, M. Tiedemann, setting out on the principle that the embryo is at the beginning neither male nor female, admits the possibility of hermaphroditism, and his opinion is maintained in Germany by M. Meckel and several other physiologists. It is true that a strange assemblage of organs has been frequently noticed, which, though in the same subject, appeared to belong to different sexes; but all cases of this sort, when divested of the marvelous with which ignorance or the love of the marvelous has clothed them, may be easily classed with some kind of monstrosity of one or the other of the sexes. No individual has ever been seen to possess both the male and female genital organs. On some occasions an enormous clitoris has induced the belief that the individual was at once male and female, and, like some of the gasteropoda, capable both of fecundating and being fecundated. Sometimes it is a slightly developed penis, an hypospadias, a slit in the scrotum, that have been mistaken for a vulva and clitoris, as in the case recently presented to the Academy by M. Rullier, and that which all the physicians in Paris may have had an opportunity to examine in a man who exhibited himself for a long time here to the public. At other times it is either a prolapsion or a prolongation of the cervix uteri, which inexperienced observers have mistaken for a penis, as happened with the judges of Toulouse in the famous affair of Margaret Malaure.

In certain cases, however, one might be considerably embarrassed in forming an opinion. A person who possessed all the external characters of a pretty woman presented herself to M. Marjolin, and begged him to examine her and inform her to which sex she belonged. In the labia of a pretty well formed vulva, the professor felt two oblong tumors, which were of the size of the male testicles; there

was a vagina which terminated in a blind sac behind the pubis, and the bladder opened under the root of a body, which bore a much stronger resemblance to the penis than to the clitoris. Professor Mayer dissected a child six months old that had no vulva, but a penis perforated with an urethra, and on the sides of which were observed two small roundish tumors inclosed in a fold of skin, and yet it had a uterus.

Girard and Lemonier presented, each, to the Society of the Faculty of Medicine, a specimen in which there were, it is said, a penis and a vulva, testicles and ovaries. But the wax model of it which has been preserved in the Museum of the *École* is far from being perfectly satisfactory.

Science possesses still more curious examples. In 1754, a blacksmith by the name of Jean Dupin died at the Hôtel Dieu, who had a vulva and a penis with hypospadias, a right vesicula seminalis, a womb, a Fallopian tube, an ovary, a round ligament, and a left broad ligament.

A case reported by Petit de Namur, in the Journal of the Academy of Sciences, and republished by Pinel, would also be very interesting, were it more minute in its details. In the case of the soldier, eighteen years old, the individual referred to, there was a womb, vesiculæ seminales, Fallopian tubes, and two kinds of ovaries and testicles. The patient who died at La Pitié in 1832, whom I saw, and of whom M. Bouillaud has published an account, presented, exteriorly, almost every attribute of the male sex, whilst interiorly, two ovaries, two tubes, a womb, and a prostate were readily recognized. Another case, which I saw also at La Pitié in 1833, had, in place of the sexual organ, merely a tubercle, somewhat resembling a penis six lines in length, and exhibited no appearances of mammæ, scrotum, vulva, hair, or beard. He was of large size, and, moreover, had a feminine voice, and all the instability and loquacity of a vulgar woman.

I would here also observe that I have found testicles, ovaries, vasa deferentia, and the uterus existing in the embryo of the cow. I do not, therefore, think we can at this day doubt the existence of several organs essential to both sexes in the same individual; yet I am far from supposing they have ever been observed in a perfectly combined state in the same individual.

I think, without, however, being able to affirm it, that the person examined by M. Marjolin was a female, with congenital hernia of the ovaries and preternatural development of the clitoris; M. Mayer's case was certainly a girl, also affected with hernia of the ovaries, and whose vagina, opening into the bladder, was continuous with the urethra. It is really impossible to say whether the individual who died at the Hospital of Bourg, aged seventeen years, was a girl or a boy. A penis with hypospadias, twenty-two lines in length, two small annular tumors, and the prominence of the penis, would rather induce me to decide in favor of the male sex, although she was destitute of hair on the pubis, and had been baptized a girl. With respect to the person noticed by M. Ricco, who presented the appearance of a female exteriorly and a male interiorly, there would seem nothing embarrassing; for I have myself seen three cases of the kind, and it is too common to require further notice.

It may therefore be admitted, agreeably to the sentiments of M. Marc, that hermaphroditism is only apparent, and its species may be divided into three genera: one in which there is monstrosity in the male; the second, in which the female sex cannot be mistaken; and the third, in which it is not so easy to characterize the individual. The Memoirs of the Academy of Sciences, those of the Academy of Dijon, the "Philosophical Transactions," the Bulletins of the Faculty of Medicine of Paris, a Memoir by M. Pierquin, almost all the scientific collections, and a work by the learned German professor Burdach, as well as that of M. Isid. Geoffroy Saint Hilaire, contain numerous cases more or less analogous to those I have above analyzed, and may be consulted with advantage.

BOOK II.

PHYSIOLOGICAL DIVISION.

CHAPTER I.

FUNCTIONS OF THE SEXUAL ORGANS.

SECT. I.—PUBERTY.

PUBERTY, or the marriageable age, is announced in girls, as it is in boys, by numerous changes. The general organization, which, until that period, had progressed alike in both beings, seems suddenly to take an opposite direction in each. The young girl becomes more timid and reserved; her form becomes more rounded, her voice alters, but to take a softer and more harmonious tone; her bosom is developed; the cellular tissue extends from the front of the breast and the hypogastrium, as from two centres, towards the neck, while it at the same time proceeds to form a soft cushion for the upper part of the limbs. Her eyes, which are at once brilliant and languishing, express commingled desires, fears, and tenderness; the sensations she experiences, and the sense of her own weakness, are the causes why she no longer dares to approach the companions of her childhood but with a downcast look. On the other hand, the gentle modesty that animates her countenance, and the seductive graces of her demeanor, soon disclose a power whose existence she never suspected, and which renders it true to say that the marriageable age in the softer sex is the spring-tide of nature and the season of the pleasures; but a new function, the catamenial, the absolute compass of good or bad health in women, is established with more or less difficulty in the midst of this great revolution, and by the disorders or accidents which it involves, sometimes dashes with bitterness those happy seasons to which it should naturally serve as the prelude. However, as a general rule, it is only the few who are visited with these irregularities, and if we were to say such was the case with the generality of young girls, we would err very greatly.

In fact, in most of them, particularly in our cities, puberty advances gradually, and the transition from youth to adult age is seldom accompanied by any very sudden moral change.

SECT. II.—MENSTRUATION.

Menstruation, or the catamenial flux, consists in a sanguineous discharge from the sexual parts. It is a natural function, to which women have in all ages of the world been subject. The suppositions of Emmet, Roussel, and Aubert, who think that the menses are the result of civilization, appear to me wholly unfounded. Neither is it true that the women of the arctic pole, the aborigines of Brazil, and

of some other countries in America, are exempt from them. Nothing, however, of the kind exists in animals, with the exception of the ourang-outang, some of the monkeys, and the bat, which, according to some naturalists, are subject to a periodical discharge. If, in other species, such as the quadrupeds, the cetaceæ, birds, &c., we sometimes find that a colored mucus escapes from the cloaca or vulva, it will be, in general, only at the approach of the season for copulation, and it would be unreasonable to compare this phenomenon with the function of menstruation.

The menses, still known among the common people as the *règles*,* *lunes*, *mois*, *fleurs* or *flueurs*, *purgations*, *affaires*, and *époques*, appear at puberty, and cease with fecundity, during pregnancy, and while the woman gives suck. As soon as they appear, fecundation is possible, and as long as they continue to return at the natural period, we may conclude that the woman has not conceived.

Observers have often made mention of women who were not regulated, and had never been so, but who enjoyed, nevertheless, a good state of health; it is to be observed, however, as remarked by Linnæus, that they were sterile. I am acquainted with a lady who is not regulated, ruddy, and of a good size, in blooming health, married for ten years, whose greatest desire is to become a mother, but who has lost all hope of becoming so; her husband, moreover, is young, loves her tenderly, and before he married her had begotten a child by another woman. I have seen another at the hospital of Tours, who had never *seen any thing*, as she expressed it, but who, notwithstanding, was the mother of a strong and healthy son of fifteen or eighteen years of age. V. D. Wiel has collected together many cases of the kind. De la Motte also reports an example of it, and M. Mondat says he saw another case of the kind in a lady who was the mother of three children. A woman of whom M. Kahleis speaks did not menstruate until after three successive impregnations, and the same observer cites two other cases of pregnancy without previous menstruation. M. Kleeman even mentions a woman who was married at twenty-seven, did not menstruate until two months after her eighth confinement, and who afterwards continued to be perfectly regular until fifty-four years of age. It seems to me to be almost certain that the absence of the menses generally depends upon some faulty conformation of the womb or its appendages; so that it may be easily conceived that it is generally a sign of sterility. Deventer and Baudelocque have known women who were never regular except during pregnancy, and I have collected several similar cases.

ART. I.—ERUPTION.

In our temperate climate the menses commence between the twelfth and sixteenth year; a little earlier, from eight to twelve years, in southern climates; and a little later, from fifteen to twenty years, in the north. Some travelers even pretend that the Turkish women are capable of becoming mothers at the age of seven or eight years. Dr. Prideaux, for example, relates that Cadisja, aged five years, was regular when Mahomet espoused her. But this story, like most others that come from countries of whose manners and customs we know so little, is only a popular tale, for I find, in a faithful translation of the Koran, that Cadisja was upwards of forty years old when she married the Prophet. Others tell us that near the poles, and on the northern slopes of mountains, it is not uncommon for the menses not to appear until the twenty-third or twenty-fourth year.

The discrepancies presented by opposite climates in mass is found to be true in the details in every country, and occasionally in every province and city. A

* I have left the French terms in this place untranslated, for they are insusceptible of translation. I have preferred to give, in a note, the English names in common use. They are *menses*, *flowers*, *monthly discharge*, *show*, *regular discharge*, *monthlies*, *time*, and in most commonly they are alluded to with a nod.—M.

country life and occupations, simplicity of manners, a frugal regimen, like the temperature of northern regions, procrastinate the first menstrual epoch; a life of leisure, the imitative arts, such as painting and music, the habit of frequenting balls, the theatre, lascivious books and pictures, good living, the use of stimulating drinks, and living in populous cities, tend, on the other hand, like the temperature of the equatorial latitudes, to accelerate its appearance. It is less precocious also in a robust woman, of a lymphatico-sanguine temperament, very fat, and whose sensibility is not very acute, than in those who are thin, delicate, nervous, irritable, and sanguine. Even at Paris, girls are occasionally observed to become regular at ten, eleven, and twelve years; I know two who were so, one at nine and a half, and the other at ten and a half years; and I am in the habit of visiting a family where a young lady, who at fourteen is as tall and robust as the majority of women at twenty, has been entirely in a state of puberty since she was eight years and a half old.

Children are also spoken of who were regular at birth, or between the first and fifth year of their age. Lieberg speaks of one regular at a year old; H. Saxonia of one at five; Tulpus of one at four; Deckers of one at two, and another at seven; A. Cooper of one at between two and three, another at two years and a half, and a third at eight and a half. We may be permitted to suppose, however, that in all these cases, which is the opinion of M. Nægèle, at least most generally, this discharge was merely the result of disease, and had no connection whatever with the catamenia. On this subject I cannot, however, withhold a case recently made public; it is that of a young girl at Havana, whose menses appeared first when she was eighteen months old, and have since that continued to return once a month. The child, moreover, has a bosom, a very decided character of countenance, and all the marks of anticipated puberty. A similar case, if not the same, is found among the recorded cases of Meckel for 1827, and republished in an English journal. Some few drops of menstrual fluid appeared at the age of nine months in this individual; at eleven months, a little more of it was seen; at fourteen and at eighteen months, still more came. There was hair on the pubis, the mammæ were quite large, and the strength of the child considerable. Other persons also are seen at this capital, who did not menstruate until their seventeenth, eighteenth, nineteenth, or twentieth years. Osiander noticed, at Gottingen, that of one hundred and thirty-seven women, nine became regular at twelve years of age, eight at thirteen, twenty-one at fourteen, thirty-two at fifteen, twenty-four at sixteen, eleven at seventeen, eighteen at eighteen, ten at nineteen, eight at twenty, one at twenty-one, and another at twenty-four years of age.

Robertson says that in the north of England the menses appear most generally at the age of fifteen, next at fourteen, next at sixteen, next at thirteen and at seventeen. From the researches I have made on the subject, I am disposed to think that, as regards the city of Paris, they most generally make their appearance at the fourteenth, the fifteenth, the thirteenth, sixteenth, and twelfth year.

Preceded, commonly, by a sense of general lassitude, of uneasiness in the limbs, of weight in the loins, of heat, of tension in the epigastrium and perineum, by a slight pruritus of the sexual parts, by a mucous discharge, that is clear or yellow, and more or less abundant, it happens also that the first eruption of the menses is in many women effected without its being announced by any precursory symptoms; it is then really abundant, nor does it commonly last more than two or three days. In general, they do not become regular until after three or four periods; in the succeeding appearances, the discharge lasts variously from a few hours to a week, but the average term is four or five days.

The *quantity of blood* that escapes amounts, according to Hippocrates, to two cotylæ, or to eighteen ounces according to Galen. Haller computes it at six, eight, or twelve ounces, and Baudelocque at only three or four ounces; in general,

it is more profuse in persons and places where its appearance is most precocious, so that European women who go to inhabit a warm climate, as for example Batavia or Java, often perish in consequence of their profuse menstrual evacuations M. Désormeaux has remarked, and I have also had occasion to observe it, that country girls who come to Paris to go to service not unfrequently find that their menses are stopped or considerably diminished.

As the different periods are not always alike in the same woman, as they are sometimes more abundant or less so every second or third period, alternately, it is impossible to have any certain data on this subject. Again, as the blood that flows from the organ can only be collected on cloths or in water, it is manifest that the observer must frequently make up an erroneous opinion, and that he ought to count upon obtaining merely approximative results.

ART. II.—NATURE.

The minds of the ancient physiologists were strongly exercised in regard to the catamenial blood. It is similar, says Hippocrates, to that of a slaughtered animal; or again, according to Aristotle, to that which flows from a simple wound. Among medical men, there are now but few opponents of this opinion, which is, however, erroneous. The menstrual fluid is a secretion, and not ordinary blood. We shall again refer to this subject. Very different ideas prevailed at Rome in the time of Pliny, and are still very commonly upheld among the public. If we might believe the celebrated Roman naturalist, the menstrual fluid, endowed with the most noxious qualities, would be considered as a dangerous poison, whose exhalations alone are sufficient to turn all the sauces of a whole kitchen, the cheeses of a whole dairy, to make a whole family sick, and wilt all the flowers of a parterre. Travelers inform us that even now, in some parts of America, women are so much dreaded during their menstrual periods, that they are forbidden to go out of doors except in cases of urgent necessity; and further that they are obliged to wear a mark that advertises people of their situation, so that they may flee out of their way. While ridiculing, as they deserve, such fables as these, the moderns have perhaps too much neglected that portion which may be true. It is very rarely that a vulgar prejudice does not contain some truth. If we reflect on the odor derived from the different secretions of animals, or the aroma exhaled from the skin of certain women, is it fair to reject without distinction all that has been said in relation to the menstrual excretion? I am certainly far from giving credit to the peculiarities related by Pliny, Columella, and the Arabians; but I do not see why the miasms that escape from a female during the flow of her menses should be incapable of turning a fluid so easily affected as milk, nor why it could not possibly have the same effect on certain sauces. Besides, it is evident that fluid retained for some time within the sexual organs, particularly in women who are inattentive to cleanliness, may, by being decomposed, acquire certain deleterious properties.

Its odor is too variable to permit us to compare it to the marigold, rather than to anything else. From its being found fluid, although long retained in the womb, some persons have concluded that it contains no fibrin. We too frequently see it escape in clots from women who get up to walk about after having been long in a sitting posture, or lying down, to be able to say, with Dionis, that menstrual blood never coagulates. I have myself stated, in the first edition of this work, that it contains less fibrin than that from other parts of the body, but is not entirely without it. Being mixed with the mucous and serous matters naturally furnished by the internal surface of the genital organs, the menstrual blood is thus rendered more viscous; and ought not to exhibit the same characters as that which escapes from a wound.

The cases I have collected, and the experiments I have made since, enable me

to maintain a more positive opinion. Hunter long since viewed the catamenia as a secretion. The experiments of M. Mojon, referred to by M. Sgorbati in the year 1812, and since by M. Lavagna, have placed the correctness of this opinion beyond a doubt. Hamilton, Jacopi, and M. Ryan also take this view of it, and there is every reason to think that it will be generally received by the profession. It is now evident that as a general rule the menses contain no fibrin. To the analysis made in Italy to prove it, we may add that of Mr. Brand and Mr. Davis of Great Britain. In order to satisfy ourselves of its want of coagulability, and to remove all doubt, it is only necessary to see the state in which it is found, in cases of very long retention. In a woman aged seventy-six years, and in whom the vagina was obliterated, the womb was largely distended, and contained more than a quart of viscous and fluid menstrual secretion. It was the same in two young girls operated on by Amand. In all those persons who have been obliged to submit to an operation for imperforate hymen, in order to give issue to retained menses, the secretion has been found to possess the consistence and appearance generally attributed to it. Frequently, however, ordinary blood becomes mixed with it, from which mistakes arise, presenting through accident the secretion in an unnatural condition.

ART. III.—PROGRESS.

The menstrual fluid is, in most women, at first very liquid, serous, scanty, and not high colored. Its consistence and quantity increase on the second day; on the third, it is in almost every respect similar to the blood that escapes from the nose in epistaxis; the fourth restores to it the characters of the second; and on the fifth its appearances are analogous to those of the first. Sometimes, on the contrary, the evacuation has a slower course, and is not really abundant until the fourth or fifth, while in others the blood flows from the commencement in as great a quantity as on the second or third day. In some cases, it appears one day, does not return the next, and flows in abundance afterwards. It most commonly comes away in the shape of simple small drops, which flow fast, and some women are obliged to be very careful to prevent it from falling in quantities to the ground.

Every menstrual period is accompanied by such decided pain about the loins and hypogastrium, or unpleasant weight at the fundament in some individuals, unmarried females, and particularly those who have never had children, that we may consider it as a true disease. The hardness, length, and unyielding character of the cervix, seem to me to be the cause of this state of things in many instances. Most frequently it arises from an irritated condition of the uterine cavity, and in this case along with the menses, we sometimes find expelled false membranes and pouches, resembling the *membrana caduca*, long since observed by Morgagni, and of which Chaussier and Burns have published some late cases. The sterility, which Denman attributes to this condition of the uterus, M. Mojon believes to arise from the closing of the orifice of the tubes by an abnormal production; but Morgagni shows that all women thus affected are not sterile. I would remark, however, that my own observations on this point rather favor the opinions of Denman or M. Mojon, an opinion also advanced by Delpach, than that of Morgagni, which I think would suit better exceptional cases. Public women and those who indulge too freely in the venereal act are very subject to the phenomena in question, and everybody is aware that sterility is frequently observed among them.

ART. IV.—CAUSE AND PERIODICITY.

The *periodical return* of the menses ordinarily takes place every month, as their name indicates, or rather every twenty-eight or twenty-nine days, which

brings them into relation with the lunar periods; in an infinity of people, they are observed to recur at nearer or remoter periods; sometimes only twenty-two, twenty, eighteen, and even fifteen days elapse between each catamenial revolution; I know a person who is never more than twelve days free from it; and I have the care of another who is almost always affected with it, but who in other respects is in good health, only she is thin, and of an extreme sensibility. These frequent returns of the menses, without any peculiar change in the health, are particularly to be observed in warm countries, and in nervous women. The emaciation which attends this state is at the critical period frequently succeeded by plumpness more or less decided, as if the sanguine discharges to which nature had become accustomed were now turned to the benefit of the whole organism!

Others are regular every thirty-second, thirty-fifth, or fortieth day, and even every two or three months, without being in the least incommoded, as is pretty frequently observed to be the case in Greenland, Lapland, and other cold countries; and neither is it uncommon to observe the same thing in our own country places; but none of these anomalies contradict the principles established by physiologists in all ages.

Without daring to set up the simple results of my own observations in opposition to those who assert that all women are regular in the first fortnight of the month, half from the first to the eighth, and the rest from the eighth to the fifteenth, I cannot refrain from stating that I have seen as many who were menstruating at the close as at the beginning of each month in the year: I therefore do not believe it possible to establish anything certain on this head.

Physiologists have been for a long time divided in regard to the *causes* of menstruation, and at the present day even, everything seems to indicate that there will not be a unity of sentiment very soon on this point. Some authors have stated, with Aristotle and Galen, Simson, Astruc, and M. Lobstein, that the menses depend upon a general or local plethora, upon a superabundance of blood; others, with Oslander, pretend that the menses are occasioned by too large a proportion of carbon and azote being contained in the blood of the uterus. Dr. Clifton refers them to the relative weakness of the venous parietes, and to the perpendicular effort of the blood. Paracelsus, Sylvius, and De Graaf, and Diemerbræck think they are produced by a principle of fermentation; Stahl and M. Dugès suppose they arise under the influence of an *irritamentum* or peculiar *molimen*; Emmet, who attributes them to an erection, and Lecat, who qualifies them as an amorous phlogosis, suppose them to be the effect of venereal desires. But who does not herein perceive that vain show of words so prodigally made use of in ancient physiology?—or, that such suppositions as these only serve to protract, without solving, the problem?

The *periodicity* of the menses has not been explained any better than their general cause. Aristotle, Vanhelmont, Mead, Hamberger, and even our elegant Roussel, attributed it to the influence of the moon. From the physicians, this opinion has passed among the people, and the poets have converted it into a proverb by the following verse:—

Luna vetus vetulas, juvenes nova luna repurgat.

But to show its fallacy we need only recollect that the same woman may be regular at different lunar phases, once in the space of several, or even of one single year; however, this is a point on which there is need for new researches, and for the complete clearing up of which, numerous observations would be required.

Many attempts have been also made with the view to ascertain the *final causes* of menstruation, but it must be confessed with equally ill success. What in fact is proved by saying that this function disposes and maintains the uterus in a state apt for fecundation? that its suppression during pregnancy permits the ovum to grow and be developed without weakening the female? It is generally

quite well known that conception does not take place until the menses have appeared, nor after they have ceased to return. But the *why* and the *how* are not known. They are the sign, and not the cause, of fecundity. The absence of the menses does not produce sterility; but women who do not menstruate are often found to be sterile, because, in either case, something is wrong in the state of the genital organs.

ART. V.—SEAT AND DEVIATION.

The *seat* of the menstrual discharge is another subject on which naturalists continue still to dispute. The Greeks, the Arabians, and a majority of writers of all ages place it in the uterus, either in the fundus, as Mauriceau says he has verified in a woman who was hung, or in the neck, as Columbus thinks. But Severin Pineau, Bohn, as well as a crowd of moderns, and among them M. Désormeaux, have seen the menses escaping immediately from the vagina, or the different parts which constitute the vulva; the uterus, it is said, cannot furnish them when they flow during pregnancy.

It appears to me to be easy to reconcile these opinions. The blood of the menses undeniably comes from the uterine cavity in the majority of instances; facts the most multiplied and authentic prove it incontestably. Thus, in persons whose menses had been long suppressed, in consequence of disease, or had never appeared, in consequence of some faulty organization of the vagina or vulva, the womb has a hundred times been found full and distended with blood; in others who died while menstruating, the cavity of the womb has been seen covered with ecchymoses, and sometimes filled with menstrual fluid. If the *os tincæ* be confined in the cupule of a pessary with a cylindrical opening passing through it, the fluid will be found to escape therefrom: when there is a prolapsus, it may be seen distilling from the cervix; and in the natural state, we find, by placing the finger between the lips of the *os tincæ*, that the fluid escapes from the part.

On the other hand, it is equally certain that it has sometimes been seen to exude from the interior of the vagina or vulva; I do not perceive, indeed, how it can be otherwise in a woman who continues to menstruate during her whole gestation, unless there be extra-uterine pregnancy or a double womb. But these cases are exceptions, anomalies, and do not invalidate the general rule. Menstruation is then *deviated* from its general route, as is the case when it takes place from the urethra, the rectum, the pulmonary passages, the breasts, or some portion of the tegumentary surfaces.

Notwithstanding their singularity, these deviations from nature cannot be questioned. In a woman of whom M. Jacobson makes mention, the menses were at first secreted from the nails after confinement and afterwards from the gums. For six years they took place from the breasts, and finally came from the lungs. In the case to which M. Raynal refers, their suppression was followed by a tumor in the hypogastrium, which opened and gave issue to them for several years. A patient, reported by Chantourelle, had them sometimes at the finger, sometimes at the angle of the eye, and sometimes at the umbilicus. Bonfils saw them escape from the thigh, from the flank, from the armpit in one case and from the index finger in another. An ulcer from a burn of the arm became their seat in those persons mentioned by M. Dupuytren and M. Ansiaux. In the case mentioned by M. Duparque, they were supplied by epistaxis. In the patient of M. Clesio, they were given off from the bites of leeches, which had been applied to the knee and to the epigastrium. In fine they in some way or other occurred in every part of the body in that unfortunate girl of whom Gardien relates the history. These irregularities, moreover, are rare, and appear to have been in more than one instance the effect of real disease.

Attempts have been made, also, to ascertain the immediate *source* of the menses, one party placing it in the veins, along with Vesalius; in the arteries,

with Ruysch; or the capillaries, with Winslow and Meibomius. Others think it is to be found in certain particular glandules, as Lister; or in peculiar little receptacles, as Simson; or lastly, with Astruc, in a supposed set of venous sinuses. There are as many gratuitous suppositions as there are opinions, all of them referring to a question as idle as it is difficult of solution. The menstrual blood escapes from the womb by secretion, by exhalation, or by perspiration, but without our being able to learn whether it transudes from the venous rather than from the arterial capillaries, and *vice versa*. In this respect, whether the discharge be derived from the body or cervix of the womb, from the vagina, or elsewhere, the mechanism of the function is always the same, and that is what it imports us to know.

ART. VI.—CESSATION.

The age at which the menses cease to appear is not less variable than that of their first eruption. Most generally it is from forty-five to fifty years; but some women are exempted at the age of forty, or even at thirty-six, thirty, twenty-six, or twenty-four, as in the instances cited by Haller and others, and of which I also have known several. I knew a young girl, twenty-five years old, who did not menstruate after the eighteenth year, and who notwithstanding enjoyed good health; and another lady, aged thirty-two years, who lost her menses at twenty-one, and felt no inconvenience. Some continue to menstruate without any inconvenience until fifty-five, sixty, sixty-five, and even seventy years of age. Cases are related of persons who have lost them at the usual period, and become regular again at seventy-two, eighty, ninety, ninety-five, or, according to the report of Blancardi, even at one hundred and five years of age. But, as M. Désormeaux remarks, although these kinds of return are not rare at sixty, seventy, or seventy-five years, it is at least certain they ought rather to be considered as the sign of some disease, than as a real resumption of the menstrual function. However, in the fact itself, there is nothing which the laws of the animal economy render incomprehensible, for we see some women recovering in this manner their fitness for fecundation. In the same manner as certain plants sometimes flourish a second time in autumn, after having been withered at the close of spring, so, also, a woman may, under certain circumstances, return, as it were, to her young age again, when she is just touching the decline of life. It is a last effort of nature to restore a more prosperous season, but which serves, unhappily, only to hasten a dissolution which she in vain desires to retard. The individual who was regular every four weeks, at the age of seventy-four, and in whose case M. Kahleis thought he ought to use the preparation of iron, ceased to menstruate at forty-four years. The case related by Duverney of a woman who menstruated at the age of one hundred and six years ought doubtless to be placed in the same category. But it would appear that the woman aged seventy-two years, and mother of fifteen children, referred to by Harles, did not cease to menstruate. Thus it appears that, in the natural order, the menses ought to cease between the fortieth and fiftieth years in our temperate climate; between thirty and forty in warm climates; and from forty-five to fifty under the colder zones. In other words, their whole duration is everywhere near about thirty years; where they are precocious they disappear sooner, and where their appearance is more tardy they are also prolonged to a later period of life. All cases that are in opposition to this general rule, ought, in my opinion, to be registered as among the exceptions, or regarded as pathological.

The change of life (*âge du retour*) is marked by the gradual disappearance of the charms of puberty; the bosom and the cheeks become flaccid, the skin is wrinkled, appears to be too large, and loses its delicateness; the eyes sink into the orbits; the carnation of the cheeks is supplanted by a yellowish tint; that

empurpled blush, which once, amidst smiles, sat on her rosy lips, is chased away by a bluish and leaden hue; every circumstance proclaims that the season of the pleasures is past, and that she can no longer rely on the attractions peculiar to the sex. This period is, therefore, very properly called the *critical time* or *critical age*; but attempts have been erroneously made to justify these epithets, by reference to the numberless dangers with which, according to the general opinion, women are at this period surrounded. In fact, the statistical researches published by Moret and Finlaison, MM. Châteauneuf and Lachaise, prove that not more women than men die between the ages of forty and fifty years. Nevertheless, the menses rarely cease suddenly, or without occasioning some disorder. On some occasions, their suppression is preceded by a gradual diminution of the duration of each period, and of the quantity of blood lost; or, on the contrary, by an increase which sometimes converts them into a pretty abundant hemorrhage: sometimes they cease, return again to cease and return, before a final stop is put to them. They become irregular in character; a mucous discharge is established; a lassitude, a sense of suffocation, nervous complaints, even severe diseases, occur in some cases; but in others, also, nothing of this kind is observed to happen, and the health, which up to that period had been precarious, becomes quite confirmed; strength is restored; the emaciated individual grows fat, and finds nothing but benefits in the loss of her catamenial discharges.

ART. VII.—RETENTION.

The menstrual secretion may, like the secretion of the urine, bile, &c., be retained in its reservoirs, accumulate and remain in the interior of its organic apparatus; the cause of this accident arises sometimes from imperforation or obliteration of the cervix, sometimes from primitive absence or accidental agglutination of the whole or a part of the vagina, sometimes finally from an alteration of the vulva or the persistence of an imperforated hymen. In relation to this matter, I must refer to the Articles *Hymen* and *Vulvo-uterine Canal*. I shall describe the symptoms indicating retention of the menses, and the operations necessary for its relief, when treating of *False Pregnancy*, or *Dystocia*.

CHAPTER II.

OF REPRODUCTION.

DESIGNED for the perpetuation of the species, reproduction is a function peculiar to living beings. Inert bodies are produced, but never reproduced. Without contradiction, reproduction constitutes one of the most astonishing phenomena of animated nature: and how many efforts have been made, from the beginning of time until now, to ascertain its mechanism! Indeed, ought not man, whose prerogative it is to think, first to endeavor to understand himself? Can anything in the universe interest him so much as his own origin? Yet these efforts so multiplied, these researches so ably conducted, and these labors of all sorts pursued so perseveringly by the most celebrated men, have hitherto scarcely served to any other end than to show him how deep is the mystery that veils the commencement of his existence.

SECT. I.—PRELIMINARY VIEWS.

§ 1. Pythagoras and his disciples said that the embryo is formed out of the menstrual blood, and a kind of moisture that descends from the brain during coition, and that it is developed according to the laws of harmony.

§ 2. Empedocles and Hippocrates, who are not less obscure than the former on this subject, thought that both the male and female enclosed the molecules of embryos of both sexes, and that these molecules were united in the womb during the sexual union.

§ 3. Aristotle, with certain modifications, reproduced the idea of Pythagoras, and, by an ingenious metaphor, made of the womb a real sculptor's shop, where the woman furnished the marble, the man the workman, and the embryo represented the statue.

§ 4. Galen set forth an opinion diametrically opposite to that of the celebrated naturalist of Stagyræ; he insists that the embryo is produced from the semen of the male, and that the material furnished by the woman serves solely for its nourishment.

§ 5. Harvey, assisted by the munificence of his sovereign, the friend of science, had it in his power to perform numerous experiments on bitches, deer, etc. His motto, *Omnia ex ovo*, already used by Fabricius of Aquapendente, though in a more general sense, places him naturally at the head of the ovarists. It must be remembered, however, that, according to him, the egg is formed in the uterus after fecundation, in place of pre-existing in the ovary, as De Graaf maintained some years after. The sort of *contagion* and *plastic power* he invokes for the purpose of explaining conception, particularly distinguishes his system from that of the ovarists properly so called. Haller, with his extraordinary talents, Spallanzani, with his honesty and his peculiar genius for observation, multiplied almost to infinity their experiments in order to throw some light on this great question, and their labors have led, or appear to lead, to this common conclusion, to wit: that the union of the germs takes place in the ovary, and that the development of the product of fecundation is a simple *evolution*, and not an *epigenesis* as is maintained in the opinion of Harvey.

§ 6. R. De Graaf thought he could demonstrate, like Harvey, that all animals come from an egg, and says that in the human species itself the germs exist in the ovary in the form of ovules, or little transparent vesicles. The ancient doctrine, entitled the *system of mixed germs*, was soon generally abandoned, while the new hypothesis, known as the *system of ovules*, already glimpsed at by Fallopius and Roderic à Castro, and favorably viewed by V. Horne and Swammerdam, spread with the rapidity of lightning. This is the doctrine that prevails at the present day; but, as may well be supposed, it has not reached the nineteenth century without having experienced numerous modifications.

§ 7. Soon after the discovery of the ovules, Ham, Hartsoecker, Leewenhoeck, and Swammerdam affirmed that the germs exist, quite formed, in the reproductive fluid of the male; that these germs, which they called *animalcules*, are living; that a single drop of sperm contains many thousands of them; that the milt of a single fish may contain 150,000,000,000, or even 300,000,000,000 of them, which, being projected in the act of coition into the uterine cavity, all perish in a few days with the exception of one or more, which are fortunate enough to attach themselves to some part of the uterus, or reach according to others the Fallopian tube; that one of them reaches the ovary, enters and lodges in a vesicle prepared for that purpose, and afterwards returns to the womb in the shape of a little ovum, &c. Hence is established a new system, since called the system of *animalcules*, a system which gives to man an immense share in the act of fecundation, while the ovular hypothesis, as understood by De Graaf, attributes almost the whole of it to the woman. What Diogenes Laertius teaches us of Heraclitus and Pythagoras, what we know of Empedocles and of Thales, what is discovered even in the works of Hippocrates, on generation, is so obscure that a number of different interpretations have been given of it. It is without surprise, therefore, we see Math. Gesner and Heinius tracing the doctrine of the animalculæ to these authors, and stating that Plato had explained it in his *Timæus*, when he says, near the end, "We sow in the uterus, as in the field, animalculæ, which, in consequence of their very small size, escape the vision." And, although it belongs to Leewenhoeck, Valisnieri seems to have taken the credit of it.

§ 8. Nevertheless, the doctrine of *epigenesis* has never been wholly abandoned. The doctrine of Descartes did not differ from that of the ancients; Mauriceau defended it to the last. It appeared also the most probable to the author of the article on *generation* in the Memoirs of the Academy of Berlin. Blegny, the opposer of the ovarists, and Lecat, who had no faith in animalculæ, and who ranked them among the inventions of charlatanism, notwithstanding the reasons advanced in their favor by an anonymous lady of Chalons, and who rejected generation by development generally, likewise adhered to the hypothesis of the admixture of germs. Maupertuis still defended it in his *Venus Physique*, published in 1754, asserting that the seed of the two sexes is formed of particles that are never commingled save in the womb, just as certain chemical elements mutually attract and combine with each other. Buffon was even very near reviving it, by presenting it in a new light: this celebrated writer supposed that, at the moment when the venereal enjoyment was at its greatest height, there were separated from every portion of the body, and of the two conjoined bodies at the same moment, a determinate number of organic molecules; that each of these molecules possessed a figure proportioned to the part of the body from whence it was disengaged, but which are similar in the two sexes; that, having reached the uterus, all the similar molecules are mutually attracted towards each other, so that, for example, those that were furnished by the eye, the nose, the ear, or the arm, the lung, or the heart, or finger of the woman, can only combine with the molecules from the eye, nose, ear, arm, lung, heart, or finger of the man.

Not one of these opinions is wholly destitute of foundation; not one which has not been defended with talent, and combated by very good arguments; none

without its partisans and antagonists; but the nature of this work not admitting of my entering into very long details so as to exhibit the just value of each of these doctrines, I shall leave the subject with what has been above said.

SECT. II.—THE DIFFERENT ACTS OF REPRODUCTION.

Reproduction, in those beings that occupy a high grade in the zoological scale, is an extremely complex act; in order to a good understanding of it as a whole, it ought to be analyzed, in some measure, in the several gradations of the animal kingdom. In the first place, it is proper to remark that the words *reproduction*, *generation*, *fecundation*, *conception*, have each a distinct grammatical acceptation, and it is wrong to employ them as synonymes, especially when speaking of mammiferous animals. The word *reproduction*, for example, is applicable to the whole function, while *generation* ought to be understood as meaning the simple creation of germs; the term *fecundation*, in its turn, only expresses the act which unites the two germs, or by which one of these germs vivifies the other; the word *conception*, which signifies to *retain*, can only be reasonably employed to designate the action which causes the fecundated germ to be retained within the sexual organs; lastly, the word reproduction is the general term, while the three others belong only to separate phenomena, which may either exist unconjoined or altogether, according to the class in which they happen to be observed.

Thus polypi, which reproduce themselves by germs, have generation, but no fecundation nor conception. The batrachian reptiles also produce germs; but these germs are of two species, those of the male, and those of the female; they must be mixed in order for reproduction to take place; but, as the mixture is effected exteriorly, the batrachians have no conception, although they have both a generation and a fecundation. In birds there is retention of the fecundated germ, and consequently, *generation*, *fecundation*, and *conception*. In the mammiferæ and man, the vivified and conceived germ is developed within the animal; and there is, further, in these cases, *gestation*, and even *expulsion* or *parturition*, at the end of pregnancy. The function of reproduction then is composed, in the human species, 1. Of *generation*, or the formation of the germ; 2. Of *fecundation*, or the vivification of the germ; 3. Of *conception*, or the retention of the vivified germ; 4. Of *gestation*, or pregnancy; 5. Of *parturition*, or the expulsion of the ovum.

ART. I.—THE GERMS.

In the infusorial animals which break to pieces of themselves, and the zoophytes which we reduce to fragments that give birth to an equal number of entire beings, germs are nothing more than analogues of the general mass of the individuals from which they have been separated. Their generation is, in this respect, analogous to that of those plants that are multiplied by slips or grafts. A little farther on in the scale, germs cannot be produced except by peculiar organs which constitute the sexes, and in that case the sexes are sometimes united in the same individual; sometimes they exist in two different individuals. Snails, oysters, a pretty considerable number of other mollusca, and all the monœcious plants, are in the first case, that is to say, they are *hermaphrodites*; the diœcious plants, and almost all animals, are found in the second; so that reproduction is here bi-sexual, and the male and female germs are always furnished by different individuals.

§ 1. OF THE FEMALE GERM.

In ascending the scale from fishes up to women, the female germ appears to be formed in the ovary. It is always found to present itself under the appearance of a vesicle, known by the name of *ovule*. Since the time of de Graaf, this fact

has been confirmed by the researches of Steno, Malpighi, Verheyen, and numerous other writers. In reptiles and birds, the ovule is very large, compared with that of women; in all the mammiferæ, its reproduction is extremely simple: the ovary is a gland whose special function it is to secrete ovules, as the liver secretes bile, &c. MM. Prevost and Dumas assure us that they have proved that the ovules are really formed by the ovary, and by nothing but the ovary; that they always exist in this gland, in adult females, who are capable of fecundation; that they are not developed until puberty, and are not found in old age; that animals that copulate at all seasons of the year also have them without interruption until they become sterile, while on the other hand they are only met with at the season of copulation in those animals that have only one rutting time in each year.

These *vesicles*, at first very small, grow at last to the size of a hempseed. As in fowls, they do not all grow at the same time; one or two generally exceeding the rest, and reaching the state of maturity first. Their coats are then thick and opaque, rise more or less above the surface of the ovary, and seem as if they would burst its investing membrane. At this period of its evolution, the germ is composed of two small coats: one, external, and the larger, adheres to the tissue of the ovary; the other, internal, and the smaller, really constitutes the ovule; while MM. Prevost and Dumas propose to restrict the name of vesicle to the former.

Cruikshank, Home, Bauer, and Plagge, who have also proved the existence of ovules, do not describe the process of maturation in the same way as De Graaf. M. Baer thought that the original vesicle was in fact nothing but the investing membrane or nidus of the germs properly so called; and from the work of M. Purkinje we have every reason to believe that a seminal vesicle exists in the cicatrix of the germ of all organized beings. It is important to bear in mind, however, that the idea Malpighi had of the ovule was very nearly the same as that of Prevost, Dumas, and Baer.

After the discovery of the ovules, and particularly during the last century, philosophers were desirous to know whether they are transmitted from the mother to the daughter, together with the principles of her organs; or whether, on the other hand, they are not formed until the age of puberty. This question, which gave rise to the celebrated theory of the *encasing* of germs one within another, has been especially argued by Swammerdam, Haller, and Bonnet. This latter insisted, with great zeal, that we ought to carry back the origin of the human beings that now cover, have covered, or will hereafter cover the globe in all succeeding ages, to the ovary of the first woman; that is to say, that the ovaries of the first woman must have enclosed, shut up one within another, the germs of all the generations that have succeeded, or will hereafter succeed; in a word, the whole human race. But these infinite divisions, in which the imagination loses itself, have caused the idea of the pre-existence of germs to be rejected, and at the present day they are regarded as the results of a mere secretion.

§ 2. OF THE MALE GERM.

The germ furnished by *male* animals is a whitish, viscid liquor called *seed*, *prolific matter*, or *seminal fluid*; when this liquid escapes from the urethra, it is composed of a substance secreted by the testicles, of the fluid exhaled from the vesiculæ seminales, and of the prostatic liquor. But which of all these various elements is the fecundating principle? It is not the *aura seminalis*; for Spallanzani could never fecundate the eggs of frogs without bringing them into immediate contact with the seminal liquor of the male. Does it result from the mixture that I have just mentioned? No; for the fluids furnished by the vesiculæ seminales, the prostate, and the urethra, can only be regarded as the vehicle of that derived from the testicles. Does it depend upon the animalcules? Seve-

ral authors maintain the affirmative, and their opinion has found numerous echoes in various parts of the learned world.

The animalcules are microscopic corpuscles, endowed with the faculty of moving in a determinate direction, and for a determinate end. Their large extremity, which is also flattened, gives origin to their caudiform portion, which is delicate and very much elongated. According to some of their partisans, they may be divided into young, old, adult, weakly, strong, male and female, &c.; and Plantade, of Montpellier, under the assumed name of *Dalempatius*, refining still more on what had been already advanced upon this subject, made out of a drop of prolific liquor a well-governed nation; he imagined a king, princess, ministers, magistrates, paupers, rich persons, merchants, soldiers, children, old men, &c. Raillery produced, on this occasion, an effect that could not be brought about by the most peremptory reasoning. The animalcular hypothesis appeared to be absurd, and thenceforth nobody dared to advocate it.

It is true that it had already been asserted that these corpuscles exist, and that they sometimes exhibit the form that had been assigned to them, but that they also appear on some occasions under another form, and that they do not in any case belong more peculiarly to the seminal liquor than to any other of the animal fluids; in a word, that they do not play any special part in the act of reproduction, or, at the least, they are not the essential agents of fecundation.

According to MM. Prevost and Dumas, the animalcules described by Leewenhoeck do not exist except in the male organs of generation, and differ from the mobile globules of the other fluids of the organism by their form, which is always the same in the same zoological species; by their mode of progression; by the situation in which they are found, &c. They always have an enlarged extremity and an elongated portion; their head, which is sometimes oval or almost circular, sometimes lozenge-shaped, at others resembles the catkin of the bulrush; but, as it is at the same time flattened, it cannot be recognized, except when seen in front. Their point, sometimes straight, very long, and conical, as in the dunghill cock, sometimes short and fine, as in the dog, at others very long and flexuous, pretty much resembles the tricocephalous worms, the slenderest worms that inhabit the human body. Upon the whole, the spermatie animalcule has a general resemblance to the tadpole of the batrachians; its dimensions do not exceed one, two, or three-hundredths of a millimeter; it is not to be seen in the seminal liquor previous to the age of puberty, nor in old men, nor in the intervals of the seasons at which certain animals copulate, nor in the mule, which, as is well known, is incapable of reproduction; it is not met with in the matter furnished by the urethra, the prostate, or the seminal vesicles, and it is to be found with the same characters in all those animals that are wholly or partially deprived of these organs. It is produced by the testicle which secretes it. Every prolific animal contains it in its prolific gland, and frequently in its deferent duct. The movement of these corpuscles seems to take place under the influence of a will; they always move forwards; they can be killed by an electric discharge, and thenceforth their motion ceases to be active. In escaping from the formative gland, the viscous matter in which they are enveloped is too thick to permit them to exercise any visible motion; but it is only necessary to mix them with some other liquid, or permit them to become diluted in the seminal vesicle or urethra, in order that their mobility should come immediately into play.

Simple microscopic globules, on the contrary, have neither head nor tail, are round or of irregular shapes, sometimes larger, and sometimes smaller, and move only under the influence of some external impression, and without any determinate end. They exist in all the fluids of the economy, in the blood, in the serum, in the milk, even in the spermatie liquor, before puberty, as well as at all other periods of life, and in all animals.

MM. Prevost and Dumas, by their numerous experiments on artificial fecunda-

tion, became convinced that the animalcules alone constituted the germ; they never effected a vivification when the liquid they made use of did not contain them, or when these living molecules had been killed or destroyed in any way; whereas fecundation took place whenever the liquor they employed contained even a few animalcules.

Although the experiments of these physiologists bear marks of the greatest good faith and accuracy, I cannot, nevertheless, withhold all reference to the authorities which prevent us from adopting, excepting in the most circumspect manner, the conclusions that might be drawn from them. In Italy, Spallanzani has maintained that animalcules are completely foreign to the fecundative act; in spite of the assertions of Gleichen, the opinion of Spallanzani prevails in Germany; in France, MM. Bory de Saint Vincent and Dutrochet are of nearly the same opinion; M. Virey regards them as containing certain small balloons distended with a kind of pollen, and which burst when they reach the organs of the other sex; and M. Raspail has very recently come out against the doctrine of animalcules, which, according to him, are nothing more than certain organic *debris*, or products of the decomposition of the sperm.

What, among so many contradictory assertions, are we to believe? what opinion must we adopt? However it may be, we may consider it as demonstrated that the female germ is an ovule, and that that of the male is contained in his spermatic fluid, and that this liquid contains such animalcules as were described by Leewenhoeck; but that, in the present state of science, the relative importance of each of these principles is unknown.

The transmission of a peculiar predisposition to disease from parent to child cannot be denied; even deformities are sometimes hereditary; and, although we cannot agree with Aristotle that the lame always have lame children, and the blind, blind children, it is very certain, however, that this frequently happens; for Mauriceau mentions that his schoolmaster, who was lame, had three lame sons, and a daughter who was not lame at all. We know, moreover, since Aristotle, that the boys, as a general rule, resemble the mother, while the girls rather incline to the features of the father, etc., but there is such variation in this respect that it is impossible to come to anything definite in regard to the mechanism of generation.

ART. II.—FECUNDATION.

When the germs have acquired their full size, a new phenomenon, by combining some of their principles, imparts to them motion and life; this phenomenon is *fecundation*, which, as to its intimate mechanism, is perhaps always effected in the same manner, but which appears to be effected in different ways in different animated beings. Although the snail has double sex, it cannot fecundate itself; a copulation with another individual similar to itself is necessary, and then each of them fecundates, and is at the same time fecundated.

Just as it happens in the monœcious plants, where, so to speak, the pollen meets, by accident only, the ovary of the female individual; so in many fishes and mollusca, chance only seems to lead the male to where the female has deposited her ova, so that he may bedew it with his sperm.

In the batrachian animals, such as the frog, although there is no real copulation, copulation is, nevertheless, requisite, and fecundation is effected while the female ova are in the act of escaping from her organs.

Lastly, in the ophidian animals, birds, the mammiferæ, and man, it is necessary that the germ of the male should fecundate the other in the interior of the female organs.

§ 1. SEAT.

But the point in the organs at which the two germs meet is not yet completely

ascertained. Is it in the ovary? Is it in the oviduct? Is it in the womb? All the ancients agreed that the vivification of the germs takes place in the womb, whether, like Pythagoras, they call to their aid an extremely subtle nervous principle, whether they invoke, like Harvey, a magnetic impregnation, or whether they content themselves with the seminal liquor of the male, to explain the fact: almost all the ovarists, on the contrary, have thought it could only be effected in the ovary, and a great majority of the physiologists of the present day are of this way of thinking.

But even here there is a great difference of opinion. According to some, the seminal fluid, after being deposited in the vagina, is absorbed and carried to the ovary through the circulation. Chaussier taught this doctrine, and it was adopted also by M. Dugès. Several adhered to the *aura seminalis* of J. Fabricius; others to a magnetic impregnation or electrical influence, and to the mere excitement produced by coition.

Among the animalculists, one party believed that fecundation takes place in the womb without any participation by the ovule; or with Maupertuis, that the animalcules attracted the ovarian vesicles to the womb in order to effect their agglomeration or germification. Others, with Andry, supposed that a single animalcule reaches the ovary, enters an ovule by lifting a small valve, and that fecundation is effected at that moment. Finally, MM. Prevost and Dumas, returning in this respect to the idea of Buffon, of Maupertuis, of Aristotle and Hippocrates, admit that the uterine cavity is the seat of fecundation.

To maintain this last hypothesis, they rely on the circumstance that they were never, in their experiments, able to find any animalcules in the Fallopian tubes, and, *à fortiori*, in the ovaries, while they frequently met with them in the womb or its horns; on the fact that, before the ovules can become impregnated, they must be enveloped in a coat of mucus, which they receive while in the tube on their way to the womb; that they could never succeed in the artificial fecundation of ovules taken directly from the ovary, while nothing was easier than to vivify such as had traversed the tube and the oviduct, &c. But Ruysch saw the prolific matter in the Fallopian tubes of a woman who was taken in adultery, and killed on the spot by her husband; Haller found semen in the seminiferous ducts of the female animals on which he experimented. Hunter said the same of a bitch that he saw killed during copulation; and the uterine cavity of a cow that had taken the bull enabled Verheyen to make the same observation. Besides, are we authorized to deny the existence of a fact observed by others, because we have ourselves sought for it in vain? Have we a right to infer, because the eggs of frogs cannot be fecundated unless they have been previously more or less thickly covered with a coating of mucus, that the same thing holds true in women? Further, these ovules, which MM. Prevost and Dumas found unfit for fecundation, could not have been forcibly detached from the ovary without having been somewhat altered by the instrument; and that, too, by the admission of the experimenters themselves. Though the existence of ovarian pregnancies is far from being demonstrated; though the fact of an embryo half in the tube and half in the ovary, as reported by Bussière, requires some new evidence; though a great many cases of extra-uterine pregnancy, examined with care, are very far from being conclusive, the experiments of Nuck—who placed a ligature on the tube, betwixt the womb and ovary, directly after copulation, and, upon killing the animal some time afterwards, found that fecundation had taken place, and that the ovum, stopped by the thread, had begun to develop itself in the ovarian moiety of the seminiferous canal—and those of Haighton, who found that fecundation did not take place in rabbits on that side where he had tied the tube, &c., appear to prove incontestably, as do those of Cruikshank, that the union of the germs does not take place in the womb.

§ 2. MECHANISM.

As to the mechanism of this union, it is still covered with an extremely thick veil. After puberty, one of the vesicles enclosed in the ovary enlarges with great rapidity, soon rises above the surface of the organ, and gradually thins its coat, which at length bursts; when this vesicle bursts, a much smaller vesicle, which is the real germ, escapes from it. This germ engages at once in the tube, which meanwhile was spasmodically applied, like a cupping-glass, to the portion of the ovary from which, during a fruitful coition, the vesicle escapes.

§ 3. THE CORPUS LUTEUM.

The capsule which contained the germ before it was ruptured constitutes what has, by Valisnieri, Santorini, Cruikshank, Buffon, and Home, been called the yellow body (*corpus luteum*); its rupture occasions a small bleeding wound, which cicatrizes by degrees, and leaves in its place a wrinkled or depressed scar more or less deep, and which Littré, Haller, and some others mistook for the real yellow body. MM. Prevost and Dumas, and also M. Plagge, appear to have fallen into the same error.

Thus far, I have been unable to form any opinion of what has been described as the *corpus luteum*; it is a subject which evidently requires some further investigation. I have often found in the ovary of woman, even before it had been fecundated, one or more yellow masses of the size of a small pea, and sometimes of a filbert. The section of these bodies at one time presents a crude condition resembling an unsoftened tubercle; at another, the appearance of concrete matter, strongly adherent, and slightly grumous; and finally a cyst in which the fluid advances from the centre to the circumference. The surface of the ovary is at times considerably elevated by them. When they reach maturity and burst, a sort of cavity is produced, which cicatrizes very slowly, and leaves quite a deep depression where it once existed. In the ovary of a woman whose organs of generation were sent to me by M. Cartereau of Bar-sur-Seine, who died accidentally, scarcely a month after conception, one of them might have contained a grapeseed, although its perforation was too small to admit a hempseed. The most difficult point to ascertain is the precise relation the germ and vesicle bear to the product. I can only affirm, that fecundation is not indispensable to either their full development or their rupture.

That which takes place in regard to a single ovule may also occur to two, to three, or a greater number. Supposing that the evolution of the ovule is put in play by the commotion that accompanies coition, by a sort of electric commotion, by an *aura seminalis*, by means of an animalcule, or by any principle whatsoever of the prolific matter; that this principle reaches the germ directly from the woman, or that it reaches it only after having passed through the general circulation, it always happens that, after a fecundation has been effected, there is detached from the ovary an ovule so modified, that it is soon recognized as a being similar to the one that produced it. This is what is demonstrated by observation; but we know nothing further about it. The systems of *preformation* or *evolution*, of *emboitement* and *panspermy*, of *epigenesis* and *catagenesis*, *expansive force*, *resisting force* of the ancients, the *nisus formativus* of Blumenbach, reproduced under a new point of view, and clothed by M. Mayer with the philosophical jargon of the German schools, teach us nothing in relation to the intimate nature of this work, which is as extraordinary as it is curious; no more than the *vegetative force* of Tuberville and Needham, the dull and stupid opinion suggested by Diderot, or the *essential force* of Wolf, so that in this light the "*que sais-je?*" of Montaigne may yet be invoked by the impartial observer.

§ 4. ARTIFICIAL FECUNDATION.

The possibility of fecundating plants artificially having been decided by Gle-

ditch, who made his experiments on a palm tree, in the botanical garden of Berlin, with some of the pollen that had been sent him from Leipsic, it was very natural to make an attempt also upon animals. Malpighi tried it unsuccessfully in the eggs of the silkworm, and Bibiena was not more fortunate; but Jacobi succeeded completely on trout and salmon, and managed, if we have faith in Gleditch, to fecundate the eggs of a "female that was dead, and already in a state of putrefaction." Spallanzani pushed the investigation much further than Jacobi, and the success he met with on toads, frogs, salamanders, &c., encouraged him in making also some experiments on the mammiferæ, and he states that he was no less fortunate in a bitch of the water spaniel breed than he was in the batrachia. Rossi, of Pisa, repeated this last experiment, and attained the same result. But notwithstanding the assertions of M. Mondat, who says he was present with M. Prinseteau at eighteen successful experiments, out of thirty performed by Morsaque of Turin, by means of a long glass tube, for the purpose of conducting the *aura seminalis* of the dog into the vagina of the bitch, still many persons of the present day remain in doubt on this subject. With respect to other animals, particularly the batrachia, MM. Prevost and Dumas have within a short period settled the matter entirely.

It has certainly never been shown that it may succeed in woman, although some authors have thought it. Nothing but the most unreflecting credulity could have induced Salmuth to say that the semen of a man, emitted into the pharynx of a woman, was followed by pregnancy of the stomach. If fecundation took place through the anus, in the case to which Louis refers, it was in consequence of the vagina opening into the rectum, and the same thing might occur through the urethra if the sexual organs opened into the bladder. If conception has often occurred notwithstanding imperforation of the vulva, it must have been from there being some small openings remaining in the hymen through which the semen has passed. These facts prove that it is not necessary in every case for the seminal fluid to be carried directly to the neck of the uterus, but it in no wise authorizes us to suppose that artificial fecundation is really possible in the human race. Besides there is no hypothesis without its difficulties. Some have even gone so far as to call in question the action of the ovaries themselves in the phenomena of reproduction. A woman died, in 1824, at the hospital of the Ecole de Médecine; for more than a year her abdomen seemed to be the seat of numerous tumors; she was in her fourth month; on post-mortem examination, there were found to be several hundred masses of brain-like substance in the internal surface of the peritoneum. We found not the slightest vestige of an ovary; one Fallopian tube and the uterus were all that appeared to be in a healthy state. We might in truth say that the ovaries do not take on disease until after fecundation, but it would be very difficult to sustain this view from the details given of the case.

ART. III.—CONCEPTION.

When the union of the germs is effected in the interior, the new product resulting therefrom is commonly retained, or arrested in some part of the sexual system. Now, this phenomenon constitutes what is properly called conception. It is evidently distinct from fecundation; for, wherever the latter is effected exteriorly to the animal, as in fishes and many reptiles, conception cannot be truly said to exist, while in the higher classes it always does exist. At a first view, it might seem useless to make a distinct phenomenon of it, and that it might without inconvenience be confounded with gestation; but upon a closer inspection we are easily convinced of the contrary. Indeed, the ophidians and birds have no gestation, and yet they have a conception. Conception, therefore, comprehends

what takes place between the instant of vivification, and the moment when the fecundated germ begins to be developed; whether it attaches itself for this purpose to some point of the generative passages, or whether it has to be expelled in order to undergo the process of incubation exteriorly. But as this is in some respects merely an abstract point of the great function which occupies us, anything further on this subject would be perfectly useless.

BOOK III.

GESTATION.

If the fecundated or conceived ovum passes out of the organs of the mother before the germ begins its development, as in birds, there is no gestation, and the animal is called *oviparous*. If the embryo is formed while passing through the oviduct, but so that it cannot separate itself from its shell until after it is laid, as in certain reptiles, there is still, properly speaking, no gestation, and such animals are called *ovo-viviparous*. Whenever, on the contrary, the egg undergoes its entire incubation in the interior of the generative system, and the foetus is not expelled until the development of its organs enables it to live and grow in the external world, pregnancy or gestation is said to exist; this is observed to take place in the mammiferæ only; in this case, there exist a gestative organ, a single uterus, or one womb and two *ad uterum*, destined to lodge the product of fecundation until it attains its maturity, and such animals are denominated *viviparous*.

Pregnancy, in the human species, is one of the phenomena of reproduction which it most imports us carefully to study. The words pregnancy and gestation are not synonymous with the words *pregnant woman* or *woman with child*. The former express a function and all that appertains thereto, from its origin until its termination. The latter indicate merely the actual state of a woman who contains within herself a fecundated or conceived ovum.

If the fecundated ovum reaches, without being obstructed, the cavity of the womb, and maintains itself there, the pregnancy is said to be *good, natural, or uterine*; if it remains and is developed in the ovary, if it falls into the cavity of the peritoneum, stops in the Fallopian tube, or becomes engaged in the substance of the womb itself, it on the contrary receives the title of *bad, preternatural, or extra-uterine*. The first species is then divided into three varieties: 1. Simple pregnancy, where the womb contains only a single ovum. 2. Double, triple, quadruple, or compound pregnancy, when there are two, three, or four foetuses. 3. Complicated pregnancy, where a polypus, a great quantity of water, or any diseased state of the product of the conception, or of the womb itself, takes place.

The second comprises four varieties determined by the seat occupied by the fecundated germ; so that authors admit, 1. An ovarian pregnancy; 2. An abdominal or peritoneal pregnancy; 3. A tubal pregnancy; and 4. A mixed or interstitial pregnancy.

After having observed that a great variety of diseases sometimes give rise to most of the symptoms of pregnancy, the French writers, adopting a still more general first division, have established a *true* and a *false* or *apparent pregnancy*, differing from each other in this, that the former is characterized by the presence, and the latter by the absence, of the foetus.

PART I.

OF TRUE PREGNANCY

CHAPTER I.

OF UTERINE PREGNANCY.

As soon as pregnancy takes place, important and numerous phenomena are manifested in the economy. Of these some are local, physical, material: others are variable, transient, general: some are common to all kinds of gestation, while others are peculiar to some sorts only. As uterine pregnancy comprises almost all of them, and further, as it constitutes the only normal kind of gestation in the human species, I shall speak, in the first place, only of those which belong to it.

SECT. I.—SIMPLE PREGNANCY.

The constitutional movement occasioned by copulation is only momentary, both in women and in men, where fecundation is not to result from it. In the opposite case, the state of turgescence, of erection or spasm of the uterus and tubes, continues, and is the prelude to a new kind of life in the former of these organs, and of numerous changes throughout the organism.

ART. I.—ANATOMICAL CHANGES.

The abdomen and its dependencies require very particular attention.

§ 1. THE UTERUS.

The alterations of the uterus are especially remarkable; its volume, its form, its situation, attitude, structure, its functions, are all about to be changed.

A. *Volume*.—After a conception takes place, the womb remains in a state of fluxion, which gradually augments its size in every direction; according to some accoucheurs, this growth is very regular and uniform until the end of the pregnancy; others assert that it is irregular and by starts. M. Désormeaux thinks it is performed very slowly in the first months, and, on the contrary, with great rapidity in the two or three last; in the first case, at the expense of the walls of the organ alone, and in the last, of the walls and cavity both. Not only does the body undergo this augmentation; Madame Boivin maintains that, in the second month, the neck is almost *two inches* in length. At the end of the third month, the womb is nearly two inches and a half through in every direction, and three inches and a half in the fourth month. At this last-named period, we observe, in the dead subject, that the plaits near the inner orifice are unfolded, and extended in long, very delicate ridges.

At seven months, the superior third of the cervix has become common with the inferior portion of the body, from which it may, however, be distinguished by a rose-colored zone, very different from the deep red tint of the rest of the womb. Its inferior portion, whiter, larger, and softer than the other, has still a dimension of about fifteen lines; but we must not here confound the neck, properly so called, with the *os tincæ*, which is only five or six lines long. The neck, which is thicker below than above, is still about an inch long at eight months, and is not wholly lost in the uterine ovoid, until in the course of the ninth month, so that, from the commencement of pregnancy until the eighth month, it grows thinner, deploys, and is gradually widened, without losing meanwhile much of its real length. Smellie says that the neck loses one-fourth its length at the third month, and one-half at the fifth, but he goes too far, at least in the greater number of cases.

While admitting a part of these assertions to be true, I think it nevertheless more correct to say, with M. Désormeaux, that, if we leave the *os tincæ* out of the

Fig. 13.



A section showing the neck of the uterus; the anterior and posterior lips are seen *in situ*, being separated from each other by the fusiform cavity of the neck.

Fig. 14.

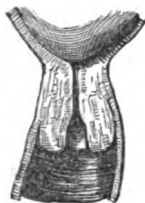


Fig. 15.



Fig. 16.



These figures show the successive yielding of the cervix uteri as the gestation advances, and how the finger gets ultimately into direct contact with the naked membranes.

question, the neck loses about one-third of its total length by the fifth month, one-half in the sixth, two-thirds or three-fourths in the seventh, three-fourths or four-fifths in the eighth, and the remainder disappears in the course of the ninth. It would be very wrong, however, to receive these assertions literally; for frequent observation, and the most careful investigation, have singularly lessened the confidence I formerly had in them. The changes to which the neck is subjected during gestation vary almost as much as its anatomical characters in the unimpregnated state. What I have said on the subject should therefore be understood only in a general sense.

At full term the vertical diameter of the womb is twelve inches in length, the antero-posterior nine inches, and the transverse eight and a half. In three women, who died at full term before the rupture of the membrane, I found in two instances fifteen inches, and in one instance thirteen inches, at the great diameter; once eight inches, and twice ten inches, antero-posteriorly; twice eleven, and once nine inches, transversely. At the level of the tubes, its circumference is about twenty-six inches, and only thirteen at the uterine portion of the cervix, which, according to Madame Boivin, ought then to be five inches higher than the external orifice. Levret says that the superficies of the womb, which, when unimpregnated, is only equal to sixteen inches, is three hundred and thirty-nine at the commencement of labor; that its cavity, which is four-fifths of an inch in the former case, rises to four hundred and eight in the latter; that its mass, which

is only four inches and a third before pregnancy begins, is fifty-one at child-birth; but the cavity of the womb is evidently carried too far by Levret, for in this way it might hold seventeen pounds of water, while the whole ovum in general does not weigh more than from seven to ten pounds.*

B. Form.—Instead of remaining flattened on its two surfaces, the womb becomes rounded, and soon grows of a pyriform shape. The vaginal angle seems to contract; to grow *smaller*. Its orifice sometimes becomes circular, or ceases to represent a simple linear or transverse slit, particularly in first pregnancies; on other occasions, it is pretty largely open, its lips become thicker and softer, chiefly in those women who have borne several children. In some instances of first pregnancy, it seems to close completely up, so that it can scarcely be distinguished by the finger.

The womb next gradually assumes the form of an oval, with its point downwards. Its posterior wall, which was, even before impregnation, more protuberant than its anterior one, grows so disproportionately that the tubes seem to descend considerably, until their roots appear to answer to the point of union of the posterior two-thirds and anterior third of the uterine circumference. Its fundus also enlarges very much. Of dimensions nearly equal in every direction, about the fifth or sixth month the organ of gestation exhibits the figure of a spheroidal vase terminated by a very short neck; it might be compared to a hog's bladder, with the urethral extremity served round with thread for the space of an inch or two: supposing that some one should now unwind the thread by degrees, from above downwards, while another blows into the bladder from the fundus, so as to distend it, we can acquire a pretty clear idea of the gradual effacement of the apex of the womb.

It appears to me that, in place of preserving its rotundity and its regularity, during the first four months, as is generally supposed, the uterus becomes somewhat flattened antero-posteriorly, and its sacral region is generally depressed in order to accommodate itself to the form of the promontory of the sacrum, or the lumbar portion of the spine.

At the close of pregnancy, the neck is nothing more than a ring, formed merely by the lips of the os tincae, and the thickness of which varies according as the woman is in her first pregnancy, or as she has already had several children. In the former case, this ring scarcely exists; a circle that grows thinner and thinner, and sometimes quite sharp at its edge, is ordinarily substituted for it; in the second, it pretty often retains a thickness of two, three, or four lines, until labor comes on. Its orifice remains habitually closed; its lips are smooth, even, and thin, even to the last, in those who have never borne children; in others, it gapes a little at an early period; I have in many cases been able to introduce the end of my finger into it in women who were five and a half or six months gone, and who were used for the purposes of the practical lessons of my lying-in room. Wider and softer below, it is then found to be harder and narrower above; its cavity resembles a pretty long finger of a glove, so that we can touch the naked membranes, and ascertain the position of the child several months before the end of pregnancy.

C. Position.—At the same time that the length and volume of the womb are increasing, it undergoes other changes, both of its postures and relations to other parts; the cervix is depressed, and approaches nearer to the vulva: this phenomenon, which is very decided in some women, and scarcely appreciable in others, is most frequently met with, and is observable for a longer time in women who have the pelvis large, and who are of a soft or naturally lax fibre; and less commonly

* A patient under my care gave birth to twins, one of which weighed in the scales 8½, and the other 8 pounds; the placenta was at least 1 pound, the water 10 ounces = 18 pounds.—M.

in those of an opposite constitution, although it is not a rare thing to find it in young and robust women, even in a first pregnancy; but the *os tincæ* does not fail to rise up by degrees, in consequence of the womb increasing more and more in volume. This phenomenon was long ago noticed by Aristotle and by several accoucheurs since his day. At three months, it is about at the same place it occupied before impregnation; after this, continuing gradually to rise, it sometimes gets as high as the sacro-vertebral angle, while, on the contrary, it begins in other instances to descend again, at about the sixth, the seventh, or eighth month, and approaches pretty near the inferior strait.

The *fundus*, which at the third month is not higher than the level of the superior strait, rises two finger breadths above it in the course of the fourth, approaches to the navel in the fifth, gets on a level with that central point, or even above it, at the end of the sixth, still goes upwards in the seventh and eighth, but never reaches either the diaphragm or liver, nor does it ever fill up the epigastric region, as has been hyperbolically or thoughtlessly stated by some of the standard authors, and as Smellie leads us to understand. I have observed that it often remains in the meso-gastric region until labor takes place. Besides, with some exceptions, it can scarcely happen otherwise, for in the last months of pregnancy, the centre of the pelvis is often from fifteen to eighteen inches distant from the navel. However, the womb, being burdened, as it were, with the weight of the ovum, seems to sink or to be somewhat crushed downwards; which compels it to enlarge proportionably in the transverse and in the antero-posterior diameters, which until then it had not done.

D. *Direction*.—While the womb remains unconstrained in the excavation, and its *fundus* is not arrested by the base of the sacrum, its posterior half, forming a larger mass than its anterior half, tends to make it turn over backwards, so that, as the *os tincæ* sinks downwards, it inclines forwards, sometimes more, sometimes less, and gets farther from the sacrum, and nearer to the pubis; a deviation that is favored by the alternate fullness and emptiness of the urinary bladder. Imperfectly supported in front by the abdominal parietes, pressed upon through the medium of the viscera by the diaphragm, and particularly as the woman, in order to maintain her equilibrium, is obliged to carry her head and shoulders somewhat backwards, the womb, as soon as it is sufficiently enlarged to touch the promontory, can no longer rise except in the line of the axis of the superior strait.

Obliquities.—Applied posteriorly against a solid, salient, and rounded part, it with difficulty preserves its station on the median line, as it proceeds upwards into the abdomen, and almost always deviates to one side or the other, to the right eight times out of ten, so that one of its sides, the left if the inclination is to the right, and the right if it is inclined to the left, soon turns forwards; whence it happens that its anterior region looks a little to the right in the former instance, and to the left in the latter; in a word, the womb seems to have turned on its great axis.

1st. *The Body*.—The inclination of the womb to the right rather than to the left has been explained in a hundred different ways. The presence of the rectum, habitually filled, in pregnant women, with hard, stercoraceous matter, has appeared to some persons sufficient to account for it; but the right lateral obliquity is to be met with also in persons who are not of a costive habit, and even in individuals laboring under diarrhoea. M. Désormeaux adds, with Rœderer, that, while rising into the abdomen, the organ of gestation is thrust to the right by the mass of small intestines, and the sigmoid flexure of the colon; which depends, says he, on this, that the mesentery, fixed on the front of the spine, descends obliquely from right to left. But there is an error as to the fact here, for the mesentery is directed from left to right; and I am astonished that M. Désormeaux, in general so correct, should have overlooked it; besides, though the sigmoid flexure of the colon is on the left, the cæcum, which is still larger, is on the right. Others have thought, with Levret, that the insertion of the placenta, by restricting the

development of one particular portion of the womb, might occasion lateral obliquities to take place. Millot defends this hypothesis, and in support of it cites the authority of Guyot, Boehmer, and Le Blanc. In the first place, it is not true that the portion of the womb in contact with the placenta enlarges less than the other parts of the organ; and, further, even if we could admit the fact, it would be necessary for the placenta to be attached almost always to the right, which is contrary to what is found to be the case. Madame Boivin attributes right lateral obliquity to the excessive strength of the right round ligament of the womb; but in that case the right angle of the womb ought not to be so distant as it is found to be from the right abdominal canal. I could more willingly admit that, being unable to rest upon the front of the spine, the womb generally inclines to the right, in consequence of the individual's habit of sleeping upon that side, and of using the right arm rather than the left; but it would be further necessary to prove that, in women who have the opposite habits, the right obliquity is never met with. But Meirieu has already instructed us that the uterus inclines to the left in a woman who is left-handed. This doctrine would be difficult of refutation after the remarks of Lavagna, Guillemot, and Villate on the subject.

2d. *The Neck*.—While the fundus and body of the womb incline forwards and to the right, the cervix generally tends backwards and to the left; however, it would be wrong to suppose that it must be always so: the orifice may remain in the centre of the excavation, although the anterior or lateral obliquities may be very great, or it may even be directed further backwards than is indicated by the position of the fundus. I have frequently found its plane parallel to the anterior surface of the sacrum in the last stages of pregnancy, although there was not any anterior inclination; it may also be turned to the right, though the fundus is inclined to that side, which is a much rarer case. These obliquities of the cervix are so common that the oldest writers appear to have had some idea of them. Aëtius, for instance, long ago pointed them out, and Moschion endeavors to attach some practical importance to them. We will see, moreover, under the article *Displacement*, that it was the same with the uterus.

E. *Thickness of the Walls*.—No subject has been more discussed among accoucheurs than the thickness of the womb during pregnancy. Galen says it is thickest at the commencement, less so at the middle, and still less at the close. Paulus Egineta is of the same opinion. Mauriceau insists that the uterus grows or distends only at the expense of the thickness of its walls. Dulaurens and Riolan, on the other hand, have maintained that this thickness increases during pregnancy, while Vesalius, Arantius, De Graaf, and Deventer admit that it remains as it was previously to fecundation. This is also the opinion of Nortwyck. De la Motte and Roederer share the opinion of Dulaurens. In like manner, Lemoine and Burton. Smellie, who found it three lines after a hemorrhage, remarks that the womb is thicker after delivery. Denman is of the same opinion as Nortwyck. Dionis admitted the estimate of Mauriceau; as regards Levret, he holds a middle position between Mauriceau and Deventer. This did not prevent Millot and Girard, of Lyons, from declaring in favor of the assertions of Galen. Such discrepancy of opinion upon a fact easy to be ascertained seems, at a first view, very strange; but let it, nevertheless, be explained with reference to the situation in which the observers were placed. The ancients, as they could not open dead bodies, were compelled to reason from analogy. Seeing that the coats of the bladder grow thin in proportion as they become more and more expanded, and that the same thing, in a large number of animals, holds good as to the uterus and its horns, they did not suppose it could happen otherwise in the human species. Besides, they found all their opinions upon the fact that, in women dying with uterine hemorrhage during labor, or in the last three months of gestation in those affected with hydrometry, or in whom the ovum contains too large a quantity of amniotic fluid, the muscular coat of the womb is indeed

very thin, and sometimes reduced to one-half, a third, and even a quarter of its natural thickness. Saviard, who says he found four lines at the insertion of the placenta, and only one line at other parts, must have met with one of these cases.

Others might have been induced to defend a diametrically opposite sentiment, because, during the first eight days after parturition, a period in which more child-bed women die than in any other, the parietes of the womb, in contracting, really thicken so much as to be an inch, or even fifteen lines through at the fundus. But, since numerous opportunities have been enjoyed of observing the actual condition of the organ, hypotheses founded on false analogies or on exceptional or badly-explained cases have yielded truth.

It is now known that the womb preserves nearly the same thickness during the whole course of pregnancy as it had when unimpregnated. This thickness, which is greater, in place of being less, as Jenty thinks, at the insertion of the placenta, generally diminishes from the fundus towards the cervix, where it is frequently found to be not more than two or three lines, or even less. It increases a little in all parts of the organ at the same time, until the third or fourth month, and then remains rather below its primitive limits, to exceed them again in the last stages of pregnancy, except the cervix, which at that period, especially, grows thinner. It was ten lines in a woman killed by a ball, and who was pregnant one month, and whose uterus was sent me by M. Cartereau, of Bar-sur-Seine. I was enabled to ascertain the fact of its being still thicker while performing the Cæsarian section on another patient at full term after the rupture of the membranes. It is, moreover, very variable in different women, and very unequal at various parts of the organ. That part which lies next the sacro-vertebral angle is generally very thin, and we sometimes observe the same disposition opposite the pubis. There is no variation in this respect, where the prominences of the child exist. It is thicker after than before the escape of the waters, and is especially so immediately after delivery. It is somewhat thinner about the middle of pregnancy, and during the first period of labor, and in some instances this diminution is particularly perceptible, especially in women who have flooded, or who die of hemorrhage without rupture of the ovum. It is, therefore, useless to argue against the opinion of Jenty, who maintains that this thickness is much more apparent than real, and that it is solely owing to the accumulation of blood in the uterine vessels.

F. Structure.—In its unimpregnated state, the organization of the womb seems to be only incipient. It is perfected, or developed, in pregnancy. Its fibres, which were pale, dense, and inextricably tangled, soften, become redder, and soon represent layers and bundles easy to detect and to follow. The cellular tissue, which was before so firm, dense, and elastic, relaxes, becomes supple, and indeed resembles the common cellular tissue, and in this way permits the other elements, which it held in bondage, as it were, to follow the impulse that animates the whole womb. The arterial branches, folded upon each other a thousand times, like the *vas deferens*, and bridled in this condition by dense, elastic laminæ, cede to the general relaxation, and gradually become lengthened; their angles, at first so sharp, with their doublings, grow blunter, enlarge, and at last exhibit only certain zigzags of greater or less depth, tortuosities which do not impede the circulation.

The *veins* undergo the same metamorphoses: already, in the natural state, larger and less tortuous, they enlarge, and are developed still more rapidly than the arteries; at term they are observed to furrow the fleshy layer in every direction, and form a network which in some measure separates it into two planes. They are large enough to admit a goose-quill, and in some instances, even the end of the little finger; near the mucous membrane they dilate so as to constitute cones with inverted bases; cones described by Astruc under the name of *uterine sinuses*, but which Haller restored to their proper nature by denominating them *venous sinuses*; and to which Hunter thinks no particular name should be given.

The *lymphatic* vessels are, according to Cruikshank, so amplified that they may, by injecting them with mercury, be made as large as crow-quills, and to form a kind of coating of silver to the surface of the womb; the *nerves* themselves, according to Hunter, also increase sensibly in size.

The *mucous* membrane, the existence of which it is so difficult to demonstrate in the unimpregnated state, becomes more evident, redder, more villous; distinct shreds of it can be separated; the folds which it forms for the purpose of enclosing the ridges of the cervix relax and disappear, but not until the last half of pregnancy; the serous coat is also far from being unaffected by all these changes, and Bichat was evidently mistaken when he asserted that the peritoneum, like the other diaphanous membranes, possesses no extensibility. At the end of pregnancy, the meso-rectum remains; the broad ligaments, and other folds, though tightened, are not effaced, yet lose some of their proportional, and even somewhat of their absolute, dimensions. Besides, admitting that they do become completely unfolded, their laminæ would be insufficient to cover a circumference of twenty-six inches. It is evident, then, that the serous coat increases in the same proportion as the fleshy coat of the womb; that it is extensible, and remains in contact with the same points of the subjacent layers, from the commencement to the end of gestation. I have even remarked, with M. Ristelhueber, that, instead of becoming thinner, it rather increases in thickness, and that its adherences scarcely relax at all while it is undergoing this amplification.

G. *Functions*.—In proportion as the uterine vessels deploy themselves, the blood is determined thither, and at last the womb, like a sponge, is gorged with the fluid; however, the menses are suppressed as soon as fecundation is effected, and some physiologists have attributed to this circumstance most of the modifications which are then experienced by the womb; but we cannot adopt such an opinion, for the same changes are observed in women who continue to be subject to a periodical discharge during pregnancy, and where the uterus is distended by a polypus, while they are not met with in a case of simple amenorrhœa. Traversed by larger nerves, and receiving a larger supply of vivifying fluids, the uterus enjoys a livelier sensibility: in the unimpregnated state, it may be touched, struck, and pressed upon, without, so to speak, causing the woman to feel any pain; during the growth of the ovum, on the contrary, the least jar, the least touch of the fœtus is instantly felt by the mother; both its sensibility and contractility are of a grade almost as high as that of the organs of relation. The womb, however, is at this time much less irritable than is generally admitted.

To explain the extraordinary development of the uterine cavity, the ancients and Mauriceau taught that the ovum dilates it by growing, just as we can dilate a glass tube by blowing into it, as we distend a bladder by filling it with a fluid or air, or as we can spread out a ball of soft wax. Puzos has not rendered this hypothesis more sustainable by calling to its support the laws observed by fluids in transuding from without to the inner side of any inert vessel; for as, in physics, the force of impulsion of fluids is measured by the height and thickness of the column, it is clear that in this case the distending effort would increase in an inverse ratio to the resistance; that, from being very feeble at the beginning, when the density of the organ is considerable, it would at the close be doubled ten times to overcome a less difficulty. Would it be any better to say, with Van Helmont, that the womb dilates spontaneously under the influence of a *blas météorisant*, or to admit, with Levret and the moderns, that, like the heart and the erectile tissues, it grows *actively*, and by the mere force of its vital properties? But in reasoning thus, the fact is explained without indicating the cause. It is at least certain that the dilating force, altogether foreign to the product of conception, exists in the gestative organ itself: a circumstance that beyond question

proves this to be the case is that, in preternatural pregnancies, as remarked by Levret, Bertrandi, Meckel, and Chaussier, and, as I have also myself remarked in five instances, the uterine cavity, though empty, dilates as it does in an ordinary gestation.

To explain this dilatation, it is useless, with Malpighi, to refer to a fermentative principle contained in the semen, or, with Blumenbach, to a peculiar vital action; the turgescence occasioned by fecundation, and kept up by the ovum, affords a very satisfactory reason for it: the congestion, of which the womb is the seat, invites to it an excess of nutrition; the new molecules incessantly deposited there necessarily elongate its fibres; the vascular channels are both uncoiled and enlarged at the same time, and as this unfolding and elongation cannot take place without increasing the extent of the curves or circles represented by each fibre and vessel in the organ, it follows that the amplification of its cavity must be an inevitable consequence of the augmented nutrition of its parietes.

Leroux and Chaussier have maintained, and in like manner Deventer, contrary to the opinion of Lemoine and Petit, that the cavity of the uterus dilates at first proportionably much more than the cervix, and I may say, in addition, that it alone dilates during the first three months. Burton remarks with reason, moreover, that the increased size of the womb is entirely owing to the development of its fibres, which takes place in every direction and without reaction, as is asserted by Millot, so as not to create any necessity of antagonism, as some writers have supposed, between its principal muscular planes.

Moreover, the ovum and the womb enlarge both together, and though the end or the function of the thing contained is not to enforce the distension of that which contains it, it at least serves to support its parietes, and to keep up its due measure of irritation. In this, as in all other cases, nature finds the means of multiplying effects without augmenting the number of causes.

§ 2. APPENDAGES.

The changes effected in the position, size, and weight of the womb will of necessity occasion some alterations in the disposition of the circumjacent parts.

A. In consequence of the depression of the cervix during the first months, the *vagina* becomes shorter and wider; at a later period, being drawn upwards along with the uterus, it becomes elongated, and at length forms a kind of cone with the apex at the vulva. By means of the fluids it imbibes, it becomes softened; its anterior and posterior columns sometimes acquire a very considerable size, especially near their lower ends.

B. The *Fallopian tubes*, retained by the broad ligaments against the sides of the womb, enlarge, become redder, more vascular, and, as it were, spongy on the inner surface of their funnel-shaped portion.

C. The *ovaries*, which are depressed in the same way, also increase in size; their vessels dilate, sometimes become varicose, so as even to burst, and occasion a fatal hemorrhage.

D. The fibres of the *round ligaments* are better expressed, enlarged, and redder, so that, at the period of labor, they compose two real muscular cords, whose contraction is in certain cases so evident, that I have in three different women observed it myself, and also pointed it out to several persons during the contraction of the womb for expelling the after-birth.

Although the descent of their roots and that of their tubes is more apparent than real, still we cannot agree with Burton in saying that they scarcely undergo any change in this respect.

§ 3. ABDOMEN AND VISCERA.

A. The *bladder* rises above the superior strait. The urethra is concealed behind the symphysis of the pubis, becomes almost vertical, its orifice retreats under

the summit of the pubic arch, and the introduction of the catheter in pregnant women is thus rendered more difficult; it may also happen that the urinary bladder, being more forcibly compressed above than below its fundus, may project against the upper part of the vagina, making a tumor there, of which I have often met with cases in the latter half of gestation.

B. The *rectum*, being, as it were, strangulated above, and no longer receiving any impulsion from the diaphragm, becomes distended with stercoraceous matters, and in that way interferes with the form of the posterior wall of the vagina.

C. The *small intestines*, being raised upwards by the fundus of the uterus, in front of which they are sometimes partially placed, may be in that way so compressed as to occasion colicky pains of a more or less violent character; at other times, their most movable portions engage in the recto-vaginal excavation, where they are liable to be strangulated and give rise to very serious affections; but they are most frequently thrust towards the lumbar regions, or else mount directly up, pressing against the arch of the colon, the stomach, and liver.

D. The *diaphragm* itself being pushed upwards into the thorax, whose base it enlarges, while its vertical diameter is lessened, is in some degree hindered from executing its contractile movement.

E. The *skin* on the lower part of the belly becomes thinner, is covered with whitish blemishes and streaks, arranged in zigzag or curved lines, with the convexity downwards; its meshes enlarge like that of a piece of stuff that yields upon being stretched, without, however, tearing. After the lying-in, it appears to be covered all over with reticulated scars, and becomes wrinkled or covered with plaits. In short women, as observed by M. Désormeaux, and I will add, in those where the abdomen attains to a very considerable size, this state of the skin is propagated as far as the thighs and breech.

F. The *recti muscles* increase in breadth at the expense of their thickness, extend to the sides, and carry with them the epigastric artery, a fact which it would be well to bear in mind in performing the Cæsarian section.

G. The *aponeuroses* become frayed; the inguinal ring enlarges a little: but the *linea alba* undergoes the greatest changes because it is more peculiarly charged with resisting the weight of the womb and the viscera; instead of one inch, it sometimes is four inches wide at its middle; toward the end of pregnancy, we find in its place nothing more than a tissue or net-work with meshes more or less supple.

H. The *navel* opens a little, grows more salient and thinner, which renders the occurrence of umbilical hernia very easy. In a great many women there is such a separation of the aponeurotic fibres upon the median line, that it seems as if it were pierced with a lozenge-shaped, or elliptical opening, the ends of which approach sometimes nearer, sometimes less near to the epigastrium or pubis. Further, in this case there is left, after the labor is over, an oblong tumor, a kind of eventration, which is sometimes increased by subsequent pregnancies to such a degree as to permit the womb to turn very much over in front, above the superior strait.

§ 4. PELVIS.

The pressure exercised by the womb upon the *vessels* of the pelvic excavation necessarily impedes the venous circulation of the surrounding parts; the external organs of generation, too, and the lower limbs, are often seen to be infiltrated, covered with varices, and affected with considerable pain; pain that may depend upon the compression of nerves belonging to the lumbar and sacral plexuses.

The *pelvis* relaxes, and its articulations, so firm and solid, change so much as in some women to become quite movable. Avicenna, Ætius, Fernel, and most of the ancients, had doubtless observed it, for they placed rigidity of the sym-

physes among the causes of difficult labor. The following sentence of Hippocrates evidently expresses the idea: "*Et totum quidem corpus dolor occupat præcipuè verò lombos et coxendices, quæ ipsis diducuntur.*" Zoar, in his "Commentary on the Exodus," also refers to it most positively, as well as A. Benedictus, Spigelius, and Gorrhœus. This opinion, however, was pretty generally abandoned about the time of Paré; although this celebrated surgeon is satisfied of having seen the separation of the symphysis in 1569, and Riolan also mentions the same fact. S. Pineau, vigorously opposed by the surgeons of Paris for having maintained it, never could convince them of it until he exhibited the body of a newly-delivered woman who had been executed. Dulaurens, Everard, Columbus, R. & Castro, holding an opposite opinion, were supported by Mauriceau and Voigt, notwithstanding the facts adduced by Courtin, by Guillemot, and finally by Diemberbroeck. Since then, Bertin and Bouvart, in a celebrated thesis, accompanied by a natural specimen prepared for the occasion; Diesch, who observed in the presence of Scschius a separation of three lines; Van Swieten, who saw this separation to the extent of half a finger; Smellie, Levret, Plessman, Piet, Desault, M. Boyer, Baudelocque, Bécлар, Chaussier, Madame Boivin, etc., who have all reported new cases of the kind, have overthrown forever the theoretical arguments advanced in the thesis of Voigt with the view of strengthening the opinion of Mauriceau.

The question, therefore, is now thoroughly settled as regards this matter, with this difference, however, that, among the moderns as with the ancients, some admit the softening of the pelvic articulations as a constant occurrence, while others consider it as an exception. Some regard it as a state proper to facilitate parturition, as a wise precaution of nature, and others again as a dangerous disease.

We shall see that each one here may be in the right. The process is quite gradual in most cases, so that the woman and the accoucheur do not observe it, especially where it is a long time taking place, as is insisted on by Deleurye. Smellie, on the other hand, has seen it carried so far as to cause the bones to ride upon each other. Denman, in his turn, mentions many cases of separation. Madame Boivin says that it is not unusual to meet with four, six, eight, ten, and even eleven lines between the pubes. M. Blundell refers to four cases during pregnancy. For my own part, I have made a note of three well-attested cases from examination after death, and four on the living subject. In some of the mammiferæ, the bones of the pelvis separate to such an extent during gestation, as to become, as it were, lost in the soft parts.

There is no question that in these cases of extreme softening, standing and walking, so painful and fatiguing in some women towards the close of pregnancy, may produce inflammation and suppuration of the symphyses, as there are numerous examples of it: it is, therefore, but just to rank, as Baudelocque, Flamant, and M. Michel recommend, the mobility of the pelvis among the pathological alterations. We can understand, moreover, how, in a case of slight contraction, this softening may be to a certain extent of advantage to delivery without placing the least confidence, with Fernel, Pineau, and others, in the action of baths, cataplasms, and other means of producing relaxation.

Is it possible, without any bad effect, to increase it by mechanical efforts, such as dilating efforts, for example? Can we believe, with Denman and others, that the pressure exerted by the child's head has anything to do with its production when the labor is violent, and yet progresses slowly?

I do not think that it is at all possible to call in question this last fact. The separation observed by Diemberbroeck, in 1654, took place during labor. Peu, who rejects as impossible the softening of the pubes, for what reason I know not, reports three curious cases of sacro-iliac disjunction, which took place during parturition. One of the observations of Smellie belonged to the same class. I will say the same of the case mentioned by Denman, in which we perceive that the

accident was followed by three months of suffering. Rupture of the symphysis itself is even possible in some cases. The observations of Dulaurens, Duverney, Ansiaux, De la Malle, Ristelhueber, and M. Bach prove it unquestionably.

Finally, a slight softening of the symphyses takes place in almost all women during pregnancy. Mobility of the pelvis occurs only in a certain number of cases. Of itself, this phenomenon seldom goes so far as to constitute disease, but it evidently predisposes the articulations, which are its seat, to various affections.

According to Baudelocque, the ligaments alone share in this operation: MM. Piet and Chaussier are wrong in teaching that the cartilaginous plates are equally concerned in it.

The symphysis of the pubis, being in almost all respects similar to the articulation of the bodies of two vertebræ, explains why the softening affects it more frequently, and always to a greater degree than the posterior symphyses, and how it happens that, in a majority of women who have borne children, its surfaces are commonly rather more distantly separated than they were before pregnancy took place, while there is scarcely a trace of separation posteriorly, unless an arthritis, followed by caries, has been the consequence of the delivery.

The consistency even of the bones of the pelvis is sometimes so altered that they become flexible. Weidmann relates a remarkable instance of this kind in the name of an accoucheur of Offenbach: the inferior strait was so contracted, that the Cæsarian operation appeared to be indispensably necessary; but, in attempting to pass up his hand, he perceived that the ischia and the pubic arch yielded like cartilage, and the labor terminated without an operation. M. Hofmeister has lately published a case nearly similar, and not less curious. According to Burns and other English accoucheurs, this state of things often exists as a symptom of the dangerous disease they describe under the title of *malacosteon*.

The separation of the hips, and the sinking of the iliac crests, remarked by Louis and M. Ribes in women, as a consequence of pregnancy, are also a sign of softening of the pelvis. Mr. Burns says, moreover, that he has observed that, after forty years, the larger part of the os coccygis is evidently thinner in women who have had children than in others.

ART. II.—SYMPATHETIC PHENOMENA.

The numerous material modifications that have just been enumerated act more or less upon the rest of the system, and give rise to what are by agreement denominated the *general, common, rational, vague, uncertain, and doubtful* signs of gestation.

A. It is a common notion, long ago inculcated by Hippocrates and Galen, that a fruitful copulation is accompanied with much livelier enjoyment than an ordinary coitus, and that it is felt at the same moment by both the parties. According to Aristotle, the copulative organ of the male is withdrawn less moist than commonly from the female organs, and the seminal fluid does not escape from them. Immediately after coition, the two beings fall into a state of languor, of weakness, of uncommon sadness; the woman feels a disposition to faintness, to syncope, to horripilation, colic, and a sort of vermicular motion which seems to proceed from the womb and pass to the iliac fossæ or flanks; borborygmi, first in the uterus, which seems to be full of gas, and then throughout the whole abdomen, and sometimes a general shivering, beginning in the abdomen, complete the series of symptoms which announce that fecundation has taken place.

B. This first condition is succeeded by pregnancy, properly so called. The eyes lose their vivacity, their brilliancy, have an expression of languor, and seem to sink in their orbits; the eyelids grow dark, and are surrounded with a blackish, livid, or leaden circle; the nose grows sharper and longer; the mouth widens by the separation of its corners; all the features of the face seem to retire

backwards, which renders the *chin* more prominent; the *face* becomes pale, is covered with spots of various sizes and numbers—sometimes reddish, or of a more or less deep brown; sometimes, but more rarely, of a dead or milk-white color—in a word, it becomes masked.

C. The *neck* swells, becomes softer, and is the seat of a congestion, which, according to Diogenes, was formerly indicated by Democritus, and which Catullus has mentioned in the following lines:—

Non, illam nutrix, oriente luce, revisens,
Hesterno collum poterit circumdare filo;

a congestion which Dumas says he has positively observed.* The breasts enlarge, become more tender, firmer; sometimes a few drops of whitish serosity can be extracted from them: the nipple rises, and is more prominent; the areola enlarges and grows visibly browner: the delicacy of their tegumentary layer increases, and they also occasionally exhibit some whitish stains, analogous to those on the face.

D. The *pulse*, at first embarrassed, acquires a greater degree of frequency, and then of force and hardness; it becomes larger, fuller, sometimes irregular, and somewhat bounding, quick, and feverish; towards the term of labor, it is found to be, says Bordeu, convulsive-like, intermittent, and corded; in fine, the artery seems to be more tense, beats with more frequency and velocity; the circulation being more active, hemorrhages are commoner and more dangerous; blood drawn from a vein, or escaping accidentally from the organs, is found to be covered with a sily coat, of variable thickness, according as the fibrin or crassamentum happens to be above or below the natural proportions. The *temperature* of the body rises, and enables pregnant women to bear cold better than others; the insensible *transpiration* is also more abundant, and at the commencement yields an odor of prolific matter, but which afterwards becomes acrid or of a peculiar nature. The *urine* flows more abundantly, is cloudy, and contains a larger sediment; all the *secretions* are more energetically effected; the saliva, in particular, is often furnished in great quantity, so that some women are attacked with a real *ptyalism*. The *liver*, being deranged in its secretions, is said to occasion the stains or ephe-lides of the face and skin.

E. The sense of *taste* and the digestion are still more specially perverted; anorexia, nausea, and even vomiting supervene, and are frequently followed with a complete loss of appetite; the woman now desires for food none but the most singular and sometimes disgusting objects. At one time her greatest happiness is to eat clay, ashes, lime, or to crunch charcoal; at another she places her delight in half putrid meat, spiders, or other unclean animals: in general, she is displeased with fat, and an animal regimen; fruits and vegetables suit her better; some ardently desire sour drinks, and love none but food prepared with vinegar, as salad, &c.

F. This state of inappetency and disgust is succeeded, after the first few months, by a very decided appetite, in some cases almost voracious, by easy digestion, fondness for wine and other spirituous drinks; but in the last third part of pregnancy, the digestive functions again become disturbed, doubtless because the stomach, being at that period too small, can only take in very small quantities of food and drink.

G. The *moral* condition of the female is also subject to pretty numerous changes: some women, naturally gay, good tempered, and amiable, become sad, melancholy, cross, unsociable, and *vice versâ*. In a good many women, the passions,

* There is more poetry than truth in the lines of Catullus. The feet become less swelled, and the neck and face more swelled by a night spent in the horizontal posture, and the lines are as applicable to men as they are to women.—M.

although previously moderate, acquire an extraordinary violence, cannot be subdued, and cause the commission of the most atrocious crimes; in others, there are merely some singular desires, such as to eat a particular kind of fruit, or meat, or game, or some particular dish, no matter at what price; an irresistible tendency to steal objects of small value, or for which they have no use, and corruption of their manners or character. There are some whose wit is never more lively, more penetrating, more agreeable: while others fall into a sort of stupidity and apathy quite unnatural in them. In general, the activity of the intellectual faculties is augmented, whether in the whole, or only in part; in one case, the memory, or a taste for the arts or sciences, is modified; in others, the judgment becomes exquisite, or the imagination is exalted to such a degree, that some women have, during their pregnancy, attained to a surprising degree of perfection in those works of genius, those arts or sciences, which they had previously cultivated with indifference and without success; some lose their senses and become crazy, always at the same period of their pregnancy; others are seen in whom mania never disappears, and who never become composed except during this function.

Some are in a particular state of electrical excitement, and M. Kuhn, who insists on having verified this assertion of Osiander, mentions a woman whose hair became evidently affected during pregnancy.

H. Many diseases supervene, are suspended, or disappear; sometimes odontalgia, without any caries of the teeth, is renewed every time the woman becomes pregnant; sometimes neuralgia, whether suborbital, facial, or of any other sort; chorea, or St. Vitus's dance; convulsions, or other motions, hysterical or epileptiform; in other cases, pulmonary consumption of a very advanced stage seems to retrograde, or even gives place to a highly flourishing state of health; a pretty considerable number of different diseases, such as chronic or obscure inflammation of the lungs or digestive passages, and serious and profound organic lesions, are affected in the same manner. But, although it is true that after parturition some of the affections that are happily modified by gestation do not return, it is but too certain that a major part of them thenceforth progress towards a fatal termination with frightful rapidity.

ART. III.—SIGNS OF PREGNANCY.

§ 1. RATIONAL SIGNS.

Such is the series of sympathetic phenomena noticed in pregnant women by accoucheurs; but they are so numerous that it is difficult to assign to them their true value. Every one of them may exist; they may even be met with altogether, without the patient's being pregnant: while, on the other hand, pregnancy often takes place without giving rise to them. Besides, how can we rely upon those that depend upon sensations experienced during or immediately after coition? Women, like all the rest of the human race, easily believe what they desire, and are willing to conceal even from themselves what they dread. They therefore will or will not experience such and such symptoms, according as they do or do not wish to be pregnant. How can we subsequently recognize among the disturbances or disorders of the mind that which appertains to pregnancy, and distinguish it from that which is occasioned by perverseness, or that which depends upon actual disease?

Be this as it may, there are a great many cases in which, by proper attention, an able accoucheur can make excellent use of the rational signs, in forming his opinion. For example, when the *mask* on the face is rapidly manifested in a woman who has never had it before, who lives in a large city, and is not exposed to the heat of the sun, it becomes a very probable sign of pregnancy. The same may be said of the violet circle round the eyes, and of the swelling and sensibility of the breasts, when they are independent of the menstrual function; of the nausea,

ptyalism, and disordered digestion, perversion of the desires and appetite, when they are not the results of a morbid suppression of the catamenial discharge. As to the odor given out by the skin; as to the perspiration, the increased temperature, the condition of the pulse, the urine, the color of the nipple and its areola, the size of the neck, the changes in the aspect of the face, &c., their existence is too variable, too fugacious, or depends upon too many different causes, or they are of too difficult determination, to permit us to repose the least confidence in them. They are merely so many resources which the learned and upright physician abandons to the shameless quack, or to the credulous ignorant vulgar, who are duped by them. I do not at all believe that the pain in the head mentioned by M. Beccaria as an almost certain sign of pregnancy has the importance which this author assigns to it, or that it merits more attention than the state of the pulse for example.

Upon the whole, the rational signs, when united in a certain number, and properly weighed, most commonly suffice to make us believe in the existence of gestation, but never to give us a mathematical certainty of it, so as to warrant us in affirming to it before a court, even although in addition to these there should be a suspension of the periodical flux.

Menses.—However, in women who have no interest in deceiving us, the last-mentioned phenomenon deserves the greatest attention; it is the most conclusive, and sometimes the only one to be met with; but, inasmuch as it is frequently the cause or the effect of a great number of affections of more or less importance, and wholly independent of pregnancy, it is not an easy matter to interpret it correctly. If it happen suddenly, without being preceded by any accident or disease that might account for it, and in a woman who is commonly very regular, it may constitute an almost certain sign of pregnancy, while, in the contrary condition, its value, always much lessened, can be determined only by a circumspect and experienced practitioner. I have no occasion to remark that it is of no value where pregnancy occurs before the first eruption of the menses. Further, it is well known that a woman whose menses have been for some time suppressed, either from disease, or merely from the progress of age, may become pregnant; that some women are never regular except when they are pregnant; and that the continuance of the menses after fecundation is found occasionally to be almost epidemic, or, at least, much more frequent in some years than in others. I have at present eight well-established cases of the continuance of the menses during gestation. For further particulars, see article on *Menstruation* in this volume.

Size of the Belly.—The enlargement of the abdomen in a woman old enough to be fecundated ordinarily suffices, with the public, to make them presume that she is pregnant. It is otherwise with physicians. It is occasioned by so many diseases, that it ought in this respect to be classed in the same category as the suppression of the menses. Nevertheless, its ordinary rate of progress is such as to yield a very important sign, and one which, alone, is, in a good many cases, sufficient to render it certain that there is pregnancy.

The belly often tumefies or swells by insensible degrees from the first week after conception has taken place; it afterwards diminishes or is even flattened about the beginning of the second month; whence the common proverb, *à ventre plat, enfant il y a*. It soon afterwards grows again in a regular manner, and never stops until the term of parturition. At first it projects along the median line or lower part of the hypogastrium; while the navel seems to sink beneath its natural level. Until the fourth month, the iliac regions appear to grow hollow instead of projecting in proportion with the hypogastrium. About the end of the third month, the navel approaches towards the level of the skin, which it soon surpasses, so as in some women to form a protuberance of an inch or two, in the course of the fifth, sixth, or seventh month. Upon the whole, the special cha-

racter of a pregnant woman's abdomen is that it grows from below upwards, and remains a long time flattened on its sides, although its middle portion already projects considerably. I shall have further occasion to advert to this point when I point out the means of distinguishing true pregnancy from the affections with which we are liable to confound it.

§ 2. SENSIBLE OR PHYSICAL SIGNS.

The sensible signs of pregnancy are obtained by means of the touch, or of auscultation, and from the material changes effected in the womb.

A. *The touch.*—The introduction of one or two fingers into the vagina, while the other hand is applied to the front of the abdomen, is called, in tokology, the *touch*. Recourse is had to it for the purpose of ascertaining the diseases of the vulva, of the vagina, the womb, the bladder, the rectum, and all the organs contained within the pelvic cavity; to learn the good or bad conformation of the pelvis, the nature, species, and degree of its contraction; but especially for appreciating the modifications of the cervix uteri, either in regard to its size, its consistence, position, length, or temperature, and the weight, form, extent, situation, and dimensions of the womb itself during the course of pregnancy. I would therefore define the touch to be: *the exploration of the organs of generation and of the pelvis of the female by means of the fingers or the hand directed to the vulva, into the vagina, into the anus, or upon the abdomen.*

The touch has always been looked upon as the compass of the accoucheur, but this has not hindered some persons, Puzos among others, from vigorously objecting to its employment. Roussel says that "accoucheurs ought to expunge from their books the impertinent directions that they give concerning the touch." According to him, the operation is too alarming to the modesty of a respectable woman, too contrary to good morals, and gives signs too vague for it ever to be had recourse to. But Roussel speaks here more like a rhetorician than a physician; his arguments, drawn from its abuse, have no bearing on the rule. Though, in many cases, the touch is insufficient, until two or three months have elapsed after conception, to convince us either that pregnancy does or does not exist, it is, nevertheless, the surest means of exploration in our power. It not only serves to determine whether gestation exists, but it further indicates the degree, the kind; it alone can teach us whether labor is near at hand or begun, whether it is in an advanced stage, whether the child presents aright, whether the assistance of art is useless or necessary, whether everything is right after labor, &c. The touch, then, is the principal lever, or at least one of the most powerful resources of the science of tokology.

1. *Vaginal touch, or the touch properly speaking. Position of the woman.*—When the woman is affected with ascites, hydrothorax, asthma, organic disease of the heart or great vessels, when her breathing is difficult, she should stand up during the operation of the touch, so as to avoid the fatigue and even danger that might be incurred by placing her in a horizontal posture. If, on the other hand, she is weak, threatened with syncope, hemorrhage, or convulsions; if the womb is strongly inclined forwards, or if from any other cause the neck is thrown very far backwards, it is better for her to lie down. Finally, if any difficulty be experienced, she should be examined in both positions, alternately.

The muscles must first be placed in a state of relaxation. If the woman is lying down, she should be told to bend her legs and thighs, as well as her head and breast, which are to be gently raised with pillows or bolsters. In the contrary case, she is to be placed against a wall, a piece of furniture, or any solid body for her support; she then separates and slightly bends her lower limbs, while she at the same time inclines her head and breast a little forwards. To prevent the awkwardness of such a posture, she may be permitted to rest her elbows or hands upon the arms of some other person, or simply upon the edge of

a table, or on a couple of chairs placed expressly for that purpose on each side of her.

Before we begin the operation, the finger should be covered with mucilage of flaxseed, or marshmallow root, olive or almond oil, butter, hog's lard, cerate, white of eggs, or any kind of grease. Mucilage is the best; but when it is not at hand, it little matters what substance we have recourse to, provided it be unctuous, and not irritating.

There are two reasons for making use of grease in this way; it would not be so easy without this precaution to penetrate into the vagina; the labia, and the hairs that cover them, might be pulled, and thus be to some women very painful; if the accoucheur should happen to have any excoriation upon his finger, he would by this means be less exposed to contract syphilis, the itch, or other contagious disease with which the woman might be affected. We would be wrong, however, in admitting such a precaution to be indispensable, for, on the other hand, it is often possible to abstain from it without inconvenience; it should be recommended simply on account of its utility.

We should learn to touch as readily with the left hand as with the right. A constrained position of the woman, a deformity, disease, or some momentary inability to use the right hand would make us soon regret not having been accustomed to the use of both.

Supposing that two fingers can appreciate the physical characters of a body better than one, Stein recommends the introduction of the fore and middle finger together: some of that writer's countrymen have followed his advice; but with the exception of a few very rare cases, it is never conformed to in France. The sensation felt, instead of being clearer with two fingers, is on the contrary more confused, and the index, when employed singly, very certainly penetrates much farther than if the medius is introduced along with it. It is only at the time of labor that the whole hand should be permitted to pass into the vagina, according to the opinion of Hensler, Flamant, M. Guillemot, and others.

In the first place, in order to introduce the finger, it should be held straight, and strongly abducted from the other fingers; or these latter are flexed so that the thumb is placed in the palm of the hand. In common, either of these two methods may be employed indifferently; but the former does not suit for women whose external organs of generation are swelled, sensitive, inflamed, or painful; the latter is applicable to all cases, and, consequently, I think it preferable, but that does not prevent me from using the other mode sometimes.

It is never indispensably necessary to uncover the woman. If she be lying down, the accoucheur should place himself beside her bed, and the hand, being put under the bed-clothes, is carried up to the vulva, passing beneath the ham corresponding to the hand that is employed. If she is standing up, one knee should be put to the floor. According to some, it should be the one that corresponds to the hand that is made use of; according to others, it should be the opposite one. The former allege the advantage of having a place to rest the elbow on, and of thus obtaining more firmness and surety in the requisite motions. For my part, I think we can touch very well in either way; however, I have for a long time past adopted the latter mode, both in my own practice and in my instructions; I find that the arm is freer, that it may be more easily inclined forwards or backwards, raised or depressed; that it accommodates itself better to the necessarily varying stature of women, to the different degrees of pregnancy, and height of the womb. After all, it is rather a matter of choice than of necessity.

The index finger, arranged, as before said, with its radial edge turned towards the arch of the pubis, is first directed on to the perineum, or posterior part of the vulva; the point of the finger is then drawn along forwards so as to pass in between the labia, and penetrate into the vagina in the axis of the perineal strait,

that is to say, from below upwards, and from before backwards, as if it were intended to reach the sacro-vertebral angle.

Previously to searching for the neck, it is proper to explore the state of the rectum, of the bas-fond of the bladder, of the longitudinal columns of the vagina, and the conformation of the straits and excavation of the pelvis.

After this first stage, the *os tincæ* is to be examined. The thickness and length of its lips, whether relative or absolute, should be ascertained, as well as their bumps or tubercles, their depressions or slits, their regularity or unevenness, and the form and direction of the orifice. We should next endeavor to determine the length of the neck as well as the size of the womb, which must be raised up so as to learn its weight.

With these precautions, it is often possible, after the end of the third month, in a lean woman whose abdomen is pretty flaccid, to take hold of the womb by its neck and fundus at the same time; to make it incline backwards, or to either side; to judge of its mobility, form, and size; to measure very exactly its length and weight; to become certain whether or not it is in a natural state, and whether or not the substance it contains is fluid.

The depression of the cervix, its gentle inclination forwards or backwards, its density, its length, and volume, whether a little more or less considerable, exhibit varieties too multiplied, and may depend upon causes too diverse for us to place much reliance upon them. Besides, to judge of them, we should have touched the same woman once or oftener, before she was suspected of being pregnant, and every one knows that this is a condition rarely met with. Alphonse Le Roy, in asserting, with the decided tone that characterized him, that augmented heat of the cervix was sufficient ground for him to affirm that pregnancy had taken place, has only given an additional proof of his arrogance and temerity.

Hippocrates and the ancient physiologists taught that the vaginal orifice of the womb closes immediately after fecundation, so as to prevent the escape of the semen; Mauriceau and other accoucheurs have remarked, further, that the cervix becomes sharper than it was in the course of the two months preceding fecundation; that it assumes the form of a cone with its base turned upwards. These changes, it is true, take place in some women, but they so often fail in those who have never borne children, and are so fugacious, so difficult in common to recognize, so slightly marked after a first pregnancy, that it is almost impossible to derive any advantage from them.

Stein affirms, and thinks with Levret, that in the first two months, the posterior lip, naturally the shorter, becomes the longer, and at length reaches the same level with the anterior one; that the slit in the *os tincæ* is transformed into an opening more or less regularly rounded and circular; that the pubic face of the lower segment of the womb gives birth to a soft and more or less projecting tumor; and that these changes most commonly suffice to prove that the woman is with child. But it is so common to meet with a circular form of the lower orifice of the womb in women who are not pregnant, and who have borne several children, and even in young virgins to see the posterior lip as long or even longer than the other, either absolutely or only in appearance, that the assertions of Stein do not really deserve a serious refutation, notwithstanding what M. Stoltz, in his excellent thesis, says to the contrary.

I cannot, however, refrain from mentioning a peculiarity which perhaps imposed itself upon him as that anterior projection which is vaguely treated of in the French translation of his work. It has happened to me several times, and I have pointed it out to a number of my pupils, to find, in women who had been already touched by a good many persons, that the anterior lip was sensibly longer and softer than at the commencement of our practical sittings; examining this lip with care, it was then easy to feel a real crepitation, and to find that it was swelled, and fungus-like; but this was a state wholly foreign to gestation, and which

was produced solely by the frequently repeated touchings to which we had subjected the woman. At other times, we feel above the vagina, immediately in front of the anterior lip, a softer, larger, more regular and less elastic tumor which does not crepitate; but this projection, which I have met with at every stage of pregnancy, evidently depends upon the bladder, the *bas-fond* of which presses the corresponding wall of the vagina more or less downwards; I should not dare to affirm, moreover, that it does not pretty frequently exist independently of the state of gestation.

2. *Anal touch*.—The touch *per rectum* is too much neglected both in tokology and surgery, inasmuch as it affords great scope in ascertaining the mobility or the fixedness, the degree of inclination, sensibility, volume, and density of the uterus, during the first three months of pregnancy. The thumb being carried at the same time into the vagina allows us to explore, with every desirable care, the recto-vaginal partition, as well as the length and size of the cervix. Serious mistakes may, however, result from its employment. When the finger is passed into the vulva and rests on the apex of the pubic arch, it readily reaches the *os tincæ*, and is almost necessarily placed in a line with the axis of the inferior strait; but when introduced into the anus, it is of course removed from the pubis, and inclines towards the axis of the superior strait, or follows the posterior wall of the pelvis, and in this way loses more than an inch in its passage. Being deceived by the position of the cervix, which is now much more elevated than was expected, and at the same time thrown much farther back, we might mistake this organ for a projection, a tumor of the posterior region of the womb, or think of a displacement, or some disease of which there is not the slightest trace.

Thus, until the second or third month, the sensible signs, the touch itself, cannot, any more than the rational signs, give us a mathematical certainty of the existence or non-existence of gestation. They sometimes permit us to establish a diagnosis that is more or less probable, but never certain; so that, during this period, the touch is in fact but a feeble resource, and women should not, without strong motives, be subjected to it.

At a later period, although the practitioner cannot affirm positively that there is a foetus in the womb, he can at least be sure that the organ is considerably increased in size. Thenceforth all that is necessary is to distinguish real gestation from the diseases that are sometimes confounded with it.

Soon afterwards, we are able to perform the *ballotement*, and to perceive the spontaneous movements of the child, which are the only phenomena that prove beyond question the existence of pregnancy.

3. *Abdominal touch*.—The exploration of the abdomen should be always added to the touch. It is too valuable in my opinion to be allowed to remain in the state of neglect into which it has fallen. There are two ways of proceeding: 1st, placing one hand on the epigastrium, while with the other we endeavor to ascertain by the perineal strait the condition of the pelvic organs; 2d, operating upon the abdomen with both hands, without touching the external organs of generation. This latter method generally does not answer until after the fourth month of pregnancy. The other, on the contrary, may be employed at any period of gestation. By their assistance we are enabled to discover the movements of the foetus. Finally, no change in the uterus or its dependencies, however slight, can escape detection after a thorough abdominal exploration.

In order to derive advantage from abdominal exploration, it is important that the woman be placed in a horizontal position, and that she should be perfectly tranquil. The *ballotement*, and those operations necessary for determining the movements of the foetus, alone require her in certain cases to stand erect, in order that the weight of the foetus may be directed towards the cervix, and not the lumbar region; her legs and thighs should be flexed: in short, she should be placed in the same position as in the reduction of a hernia. The operation is

most readily performed before breakfast, and when the rectum and bladder are in a state of vacuity.

When the combined exploration is necessary, we commence by introducing the index finger into the vagina as high up as possible behind the os tincæ, so as to elevate the womb and carry it above the pubis, while the other hand, placed on the hypogastrium, depresses, slightly but forcibly, the abdominal parietes from above downwards, and from before backwards. We cannot fail, then, to seize the uterus between two opposite points, even in its unimpregnated state. When we have reached this point, the least motion of the hand from without is immediately felt by the other, and *vice versâ*. Thus we ascertain not only the length, but also the diameters, the ridges or the rounded form of the womb, its mobility, its adhesion, and even to a certain degree the nature of its contents. We obtain equally correct results by the aid of means which I shall now point out: 1st. When we wish to determine the length of the womb, the finger which supports the cervix, with its palmar surface turned in front and slightly flexed, should raise this organ so as to make it follow the axis of the superior strait. 2d. When our object is to touch the surface or the edges of the uterus, we should, on the contrary, endeavor to draw it towards the pubis at the risk of tilting it over, and causing a sort of retroversion. 3d. In the former case, the hand on the hypogastrium, placed about an inch above the symphysis, presses likewise in the axis of the superior strait; but from above downwards. 4th. In the latter, it must rest close to the bones, so that the extremities of the fingers are directed either backwards, towards the anterior face of the sacrum, or considerably downwards so as to reach the vulva, as it were, through the excavation. 5th. After having examined the median line, we must do the same on each side, and in this way run over the whole circumference of the strait. 6th. By manipulating in this manner, the two hands frequently come in contact with each other; for the wall of the pelvis is but one inch and a half in front, and at most three inches at the sides, while the hand may depress the belly as far as the excavation beneath the plane of the strait. 7th. When a woman is lying down, the abdominal depression may extend very nearly two-thirds of the pelvis below the promontory at the hypogastrium, so that nothing escapes the examination with both hands.

So true is this that, by gliding along the vagina over the different points of the anterior half of the pelvis, the index finger reaches without difficulty above or on a level with the strait, so as to be distinctly felt by the other hand either at the level of the pubis, or at the internal edge of the iliac fossa. It is therefore rare that a simple engorgement of the ovaries, or of the tubes, of the appendages, of the womb in general, or even of the lymphatics, or the presence of the smallest urinary calculus, escapes detection. The reader may consult the views of MM. L. and Th. Giraud, in respect to this matter, and observe what takes place in the surgical wards where many diseases of the uterus are observed. As regards myself, I have no fear in saying, after frequent proof, that, by proceeding in this manner, we are enabled to ascertain the state of gestation in as many women in the second or third month, as in the fourth by the simple touch.

The abdominal touch alone comprises several varieties. By causing the woman to draw some deep inspirations, and at the same time laying the hand between the pubis and the umbilicus, as Roederer recommends, the womb is observed at the place of its attachment in the centre of the excavation or hypogastrium. If gentle pressure be made so as to touch the iliac fossæ at their deepest part, reaching without difficulty the sacro-lumbar angle, and the entire abdominal portion of the spine, it is impossible not to come in contact with the uterus in the strait or above it, provided it has obtained any development. During the first three or four months, it presents the appearance of a hard tumor, more or less rounded, is a little nearer the promontory than the pubis, sometimes on the median line and often slightly on one side; in proportion as pregnancy advances, it appears to

present to the hand of the observer more and more the appearance of a cyst, and in place of a solid mass, we may expect to find it between the umbilicus and the pubis, or in the vicinity of one of the iliac fossæ. It is distinguished from the other viscera by its circumscription, its regularity, its oval character, and its tension, and in this respect differs in fact from an ovarian cyst, merely by its locality, its form, and the presence of the fœtus. By making direct pressure posteriorly, first with one hand, and then with two, certain prominences of the child are readily observed, and its volume in this way ascertained after the fifth month; in some cases it suddenly retracts, or at least almost always makes some movement sufficiently marked for detection.

It follows from these details that abdominal exploration is an excellent means for detecting pregnancy, and that in many instances it may be used in place of the internal touch, to which it is also a powerful assistant; it is, however, not applicable in all cases. The abdominal parietes are so thick in fat women, and so dense or resisting in those who are robust or very muscular, that they destroy the effects of the pressure. Great irritability, pain in some part of the belly, disease with organic alteration of the viscera, a large quantity of water with a little fœtus in a small womb, also render its employment either difficult or of little dependence. But, putting these exceptions, and some others aside, it must, as Stein has already admitted, hold the first rank among the diagnostic means which the accoucheur has at his command. Rœderer, who has also received it, lays down some rules on this point, which, though well to remember, are too vague to be of any great assistance to practitioners. Baudelocque confounded it in some way with the operation of ballottement, and was unable therefore to give a proper description of it. A professor of Hamburg, Wigand, would doubtless have been unable to assert, in 1807, that it is easy to detect pregnancy in the first three months, unless he had placed great confidence in abdominal touch. Attention to its importance was first drawn by Joerg, who insisted on its value in 1814 in two different works. Since then, M. Schmidt has shown it to possess such decided advantages that it would be unpardonable for any practitioner to be ignorant of them.

4. *Ballottement and passive movements of the fœtus.*—In effecting what is called *ballottement*, after having first placed the index finger under the cervix, the summit of the other hand is to be applied over the fundus of the womb, by pressing it against the belly, which is to be carefully depressed so as to push away the bowels and fat. In this way the womb is held in the most exact manner possible, by the two extremes of its longitudinal diameter, and now the womb is to be suddenly pushed upwards with the finger that is in the vagina, while the hand on the hypogastrium attends to and judges of the motion experienced by the ovum. The fœtus, which is movable, free, and the only solid substance within the amniotic fluid, strikes directly opposite to the point that received the impulse. If the hand that is outside receives no shock, the motion is to be sent back to the other one in the vagina. Should the first attempt fail, it is repeated several times, communicating the impulse with each hand alternately, and taking all proper precautions not to give the woman any pain. The same thing happens here that is seen in physics when experiments are made on the transmission of motion. Indeed, let a vessel full of water be struck on any part of its circumference, and the little figures that have been suspended in it by means of glass bubbles or small bits of cork will immediately move to the opposite side. But it is easy to understand that, in order to obtain this result, the fœtus must have attained to a certain size, that there must be a sufficient quantity of liquor amnii, that the uterus and parietes of the abdomen must not be too thick, and that the operation must be done with a dexterity and skill that can only be acquired by practice on the natural subject.

Whenever a solid and movable body has struck one or both hands during the

operation for *ballottement*, there can be no further doubt as to the woman's being pregnant; but care should be taken not to be imposed upon by a jar of a fluid, or any other kind of motion. It is only from the fourth to the sixth month that the *ballottement* presents a resource of any importance, for it is rarely that the jar of the fœtus can be perceived before the end of the third; and in the next three months of gestation it is in general too easy to determine the state of the woman to make such a recourse needful.

Ballottement impresses on the ovum only a passive motion, which is the same whether the fœtus is dead or alive, and which would be the same were it possible for a polypus, or any other solid and large body, to be free and movable in a uterus filled with any kind of fluid. *Ballottement* makes us know that pregnancy exists.

But active or spontaneous motions alone give us the certainty that the fœtus is living.

5. *Active movements of the fœtus.*—The child does not move in an active manner until after its muscular system has acquired a certain degree of development; and still its motions must be so weak that the woman can hardly perceive them until in the course of the fourth month. At the beginning, she has a feeling of *formication*. Afterwards they acquire a force that varies according to the vigor of the child, the stage of pregnancy, and the good or bad health of the mother. Their strength most commonly increases until the birth; sometimes they increase for one or two months, become less marked in the sixth and seventh, and resume their activity towards the end of pregnancy. M. Désormeaux has seen them cease entirely from the end of the fifth month, and the child nevertheless be born strong and healthy at full term; in other instances, they are never perceived at all. Some able practitioners, such as Mauriceau, De la Motte, Baudelocque, &c., mention women in whom attempts had in vain been made to excite them, and who were nevertheless delivered of robust and well-grown children. It may be supposed that plethora, some constraint, some difficulty in the circulation of the fluids of the ovum, or even those of the woman herself, may render them duller, slower, more obscure and vague; and that the free exercise of all the functions, cheerfulness and contentment of the mother, and a proper degree of strength on the part of the child, give them more energy and vivacity. Delicate, nervous, and irritable women feel them sooner and more plainly than those whose sensibility is less exquisite, who are not in the habit of carefully analyzing their sensations, and who, in consequence of their temperament or disposition being naturally more quiet, possess a calmer imagination and less impressible organs. The former sometimes assert that they have felt the child move at the end of the third month (which seems almost impossible, since the muscles are still mostly gelatinous), while the latter do not commonly speak of it until towards the end of the fourth.

If the motions of the child are very decided, quick, and frequent, it is not necessary for them to move the abdominal parietes in an evident manner, as is sometimes seen, to guard the woman against confounding them in any way with motions of another kind; but when they are weak, and return but rarely, nothing is more common than for other sensations wholly independent of them to be mistaken for them; so that the prudent accoucheur should never pronounce upon them without having made himself perfectly sure.

For this purpose, it often suffices to apply the hand, which must be cold and naked, to the abdomen; it may be previously rubbed with brandy, Cologne water, &c., or dipped in cold water, with vinegar and ammoniac in it. This application produces a sudden transition in the temperature of the hypogastrium, which reacts upon the child, and causes it to move in a convulsive manner. If this simple means does not succeed, the palm of the hand is to be placed on one side of the abdomen, which should then be properly struck with the other, as in

examining into the existence of ascites. The foetus thus disturbed scarcely ever fails to move with some force; and this is a sort of *ballotement*, which possesses the advantage over the common method of not requiring the finger to be introduced into the sexual organs, but which has also the disadvantage that it cannot be usefully employed until after the fifth or sixth month.

6. *Auscultation*.—After having properly performed the touch, having attempted to effect the *ballotement*, and to feel the motions, whether active or passive, of the foetus in vain, we have no method of solving the problem left except auscultation.

After Laennec had shown that it is possible to see with the ear what is passing inside of the chest, it was natural to suppose that auscultation would soon be applied to the investigation of the diseases or functional changes of other parts of the body. MM. Mayor and Fodéré had already given some hints on the subject when M. Kergaradec, in an interesting memoir, maintained that gestation may be ascertained with great certainty by means of the stethoscope. According to that physician, two kinds of sounds may be heard in the womb of a pregnant woman: one, which, although quicker and shorter, is analogous to that of a feeble respiration, is the *bruit de soufflet*; the other, similar to the ticking of a watch wrapped up in cloths, depends on the beating of the heart, and may be called the *sound of the heart*.

1. *Placental sound*.—The former is isochronous with the pulsations of the mother; but it is in almost every respect similar to that caused by muscular contractions, that heard in the large arterial trunks when spasmodically contracted or compressed by some external tumor, and in the heart itself in certain pathological states at present not well understood. It is also compared to the sound produced by the vibration of a strong wire, to the sibilant murmur, to the sonorous rôle of the chest, to the murmur of an erectile tumor, and the purring of an aneurismal varix.

M. Kergaradec thought that it corresponded to the place where the placenta is attached, and was produced by the passage of blood from the womb to the vessels of the ovum, or in other words by the uterine or placental circulation. In the majority of cases, it requires a very practiced ear to perceive it at all, and this is doubtless the reason which has induced many physicians to reject it altogether.

In consequence of this, certain individuals, A. Baudelocque and Nauche, for example, have proposed an instrument called *hysteroscope* or *metroscope*, so arranged as to be applied to the neck of the womb, through the vagina, for the purpose of hearing these sounds better, but I do not think it worthy of attention.

I have myself in vain sought for it in a great many subjects. On the other hand, I have distinctly heard it in a great many others. It was sufficiently strong in three women who were confined at the *Hospital de Perfectionnement*, and in two others who were made use of for the practical demonstrations of my course, for the least skillful medical students and female pupils in midwifery to hear it very plainly. I have never met with it except in the second half of pregnancy. If Laennec and M. De Lens, who say that they have heard it before the end of the third month; if Mr. Kennedy, who insists on having discovered it, at the tenth, the eleventh, or twelfth week, were not mistaken, that alone appears to me to be reason enough why it is impossible to attribute it to the placento-uterine circulation.

Of late years, this *bruit* has greatly occupied the attention of accoucheurs. Whilst Miesner in Germany, and Nægele in Great Britain, deny its value, we see in these same countries any number of practitioners considering it a certain and almost constant sign of pregnancy. Mr. Kennedy almost invariably found it, and believes that in many cases it naturally renders vaginal examination useless. Elliotson is of the same opinion. Mr. Fergusson sees nothing

more certain in obstetrics. In fine, by its assistance alone, Nægèle was enabled to ascertain the existence and position of twins in two well-authenticated cases. The same difference of opinion exists in France in relation to this subject. If M. Forestier is violently opposed to auscultation as applied to pregnancy, if M. Dugès calls in question its utility, if M. Lenormand places little confidence in it, M. Monod and Mr. Kennedy, on the other hand, believe it will render the touch superfluous in most cases after the fourth month. The controversy that arose between Nægèle, Clinton, and Kennedy finally shows that, on this point, the most opposite opinions may be defended. In place of looking for the seat of the *bruit de soufflet* in the circulation of the uterus, Haus places it in the aorta, or the iliac arteries, whilst Mr. Kennedy, without hesitation, attributes it to the utero-placental circulation, and M. Monod to the placental circulation alone.

This bruit should, as a matter of course, present to all the same natural characteristics. The passage of the blood of the womb to the placenta cannot be the cause of it, for there is no direct circulation between the mother and the foetus, and if any should exist between the ovum and the uterus, it is altogether capillary, as I shall show in the article *Fœtal Circulation*. The uterine placenta and foetal placenta, admitted by Hunter, the utero-placental vessels described by Albinus and M. Dubois, and on which Mr. Kennedy relies, do not exist in the way this author supposes. Besides, his hypothesis is overthrown by his own observations. He remarks, in fact, that the *bruit de soufflet* continued in a case in which the child had died from prolapsus of the cord; that Collins and Darley have been able to hear it forty-four hours after delivery; and that in a case of hydrocephalus which required perforation of the cranium, he recognized it opposite the iliac vessels, although the child was dead, &c. If it exists even after delivery, how can it be referred to the placental circulation? It is true, Mr. Kennedy believes he solves the difficulty by mentioning the circulation of the maternal placenta; but all who have had occasion to examine a certain number of wombs in a state of pregnancy know that there is no maternal placenta in the human family. The observation of d'Olivry, repeated by M. Cazenave, by M. Monod, by Mr. Kennedy, and by several other observers, proving that this *bruit* ceases the moment the ovum is separated from the womb, loses therefore all its importance in this respect. Moreover, the *bruit de soufflet* may exist without pregnancy. Here is an instance of it. A woman aged 30 years and upwards was admitted into the medical wards of the Hospital of St. Antoine in 1829. In her case, the *bruit de soufflet* was most distinctly heard. M. Rayer, who satisfied himself of it several times, and likewise his students, begged me to examine her. I recognized without any difficulty what he had stated to me. On making examination at the hypogastrium, it appeared as if the womb had advanced four or five months in pregnancy; but, on further investigation per vaginam, there was discovered a part of a spherical body engaged in the strait, which we took to be a polypus. This patient dying several months after, in consequence of the growth of her tumors, we were enabled, by a careful dissection, to show that the two fibrous masses with which she was affected had no connection whatever, either by tissue or circulation, with the womb, and consequently that the *bruit de soufflet* may exist without pregnancy, and without decided increase of the vascular system of the uterus. Perhaps in this case it might have differed from the real *bruit de soufflet*.

Mr. Kennedy thought he had remarked the *bruit*, heard after confinement, to be short and quick in place of a sibilant murmur, gradually dying away. M. Monod, who says he invariably heard it after the fourth month, describes also its peculiar characters, so that the observer might not confound it with any other; but I am satisfied that, if there was a difference between the *bruit* observed in the patient of St. Antoine, and that which I have in several instances heard in pregnant women, it was scarcely perceptible and difficult to appreciate.

Since it is heard after delivery, it is useless to discuss the opinion of M. Monod,

referring it to the placental circulation, or that of M. Capuron, connecting it with the cardiac circulation of the infant. By a little attention and tact, it will be confounded neither with the pulmonary *bruit* of the mother, nor with the fibrilar murmur of the muscles of the abdomen, of the intestines, or of the womb itself. The uterine circulation, properly so called, and the passage of the blood through the large vessels of the pelvis, are the only remaining probable causes of the phenomenon. Supposing that it can be heard in the same woman at almost any part of the uterus indistinctly, it would no longer be possible to maintain, with M. Laennec, M. Monod, Kennedy, etc., that it is always connected with the attachment of the placenta. Unfortunately, we do not as yet possess facts sufficiently conclusive to enable us to take a decided stand in regard to this matter. P. Dubois, in truth, remarks that he has in several instances been satisfied of the *bruit de soufflet* occupying large surfaces; but, as he at the same time observes that he has heard it at two points of the womb, from *fifteen to eighteen inches* apart, we are inclined to think that some of his observations were not made with any desirable attention. In fact, the greatest diameter of the uterus above the strait does not exceed ten to twelve inches; from the os tincæ to the fundus, we might get fifteen, but not eighteen.

So far as the vascular system of the uterus is concerned, it is then still best explained by placing it on a level with the placenta. We must not, however, be deceived on this point; many facts do not correspond with the hypothesis. The mind is not satisfied in cases where it can be heard two days after delivery, nor in those cases referred to by Dubois, and still less in those where there is no impregnation.

Thus we are almost necessarily compelled to look for it in the vessels of the pelvis, notwithstanding the opinion of M. Kergaradec. The pressure of the arteries would then alone account for it. The size of the womb would explain how it is only heard at the fourth month, without rendering its existence impossible during the course of the third, as M. de Lens and Kennedy think they have observed. As it is possible, at a more advanced period, that the resting of the stethoscope on the abdomen causes the uterus to press more either on the iliac arteries or even on the aorta itself, so that the pressure of the circumjacent organs in every way increases more and more, we shall understand how it should be the more powerful, the greater the degree of advancement in pregnancy. Its presence also at two different points by the pressure either of the two iliacs or the iliacs and the aorta is in like manner understood. It would be the same when it continues after delivery, or the death of the fœtus, and when it corresponds with a pathological growth of the uterus. We must also take into consideration its cessation during uterine contraction, and its alternate re-appearance in the relaxation observed by Kennedy in a woman who, several hours after the expulsion of the fœtus, was seized with flooding, and as observed by M. Monod during labor. I will further remark, however, that most frequently this *bruit* seems so close to the ear, and so positively residing in the walls of the uterus, occupying a place so different from that which the position of the pelvic arteries would seem to indicate, that we do not hesitate to reject, as it were, in spite of ourselves, the theory of M. Haus. A way of reconciling so many different opinions, of embracing all the facts, and removing the greater part of the difficulty, would be to admit that the *bruit de soufflet* is found sometimes in the blood-vessels of the pelvis, and sometimes in those which traverse the walls of the uterus themselves; but the subject never having been examined in this point of view, I do not think it necessary to dwell longer upon it.

Notwithstanding the uncertainty that exists in relation to its location, and which cannot be denied, the *bruit de soufflet* appears to me to be of the greatest importance in tokology. In all probability, it is not the same in fact after confinement, or in an unimpregnated state of the uterus, as during preg-

nancy; and I may not have detected all the varieties of what I heard at the Hospital of Saint Antoine.

If we should ever succeed in rendering all mistakes in this respect impossible, its existence would immediately give certain proof of impregnation, and of the fœtus being alive. It would also assist in detecting multiple pregnancies, and the insertion of the placenta, but it is doubtful whether practice can derive any real advantage from it, in detecting the condition of the parts in case of hemorrhage, or disease arising from delivery, as M. Monod and Hohl would hope.

2. *Cardiac sound.*—The double beat, or sound of the heart, cannot be confounded with any other; for the pulsations can be counted to the number of a hundred and twenty to a hundred and fifty per minute, while the mother's pulse beats only from sixty to eighty in the same space of time. Growing stronger as the fœtus grows older, this sound can scarcely be appreciable before the fourth month. Of a necessarily variable intensity, on account of a great many circumstances that are difficult to characterize, it is never heard better than when the child's back corresponds to some part of the anterior surface of the uterus; I have scarcely ever failed to detect it when *able to seek* for it with all suitable care.

The anterior curve of the fœtus, and the relations of the heart to the spine, are the reasons why the back is the only part that is evidently capable of transmitting the double beat to the ear of the observer. This double beat is most frequently and distinctly heard between the left or right crural arches and the umbilicus. From this remark it may be conceived that it may change its place if the fœtus changes its position, and that, before affirming that it does not exist at all, we should have by turns explored the hypogastrium and the loins, the flanks, and all the various parts of the circumference of the pelvis.

In order to perform the auscultation, the woman must be lying down, although in fact she might be allowed to stand up; if the pregnancy be somewhat advanced, the ear will suffice, and sometimes succeeds better than the stethoscope with persons not in the habit of using that instrument. However, it can only be conveniently applied on the anterior half of the abdomen. Moreover, the friction of the gown or any other part of the woman's dress, whom it is unnecessary to uncover during the operation, may frequently deceive us as to the nature of the sounds we hear. Notwithstanding the opinions of M. Fodéré and M. Siebold, who style it the auricular trumpet, the stethoscope in general yields a clearer or more intense sound. Besides, it can be applied at all stages of pregnancy, and to all the points to which the fœtus seems able to turn its back; the end piece is to be taken off; then, after having felt for the womb, it is placed first on the left, then on the right, and next on the middle of the hypogastrium; it is even applied to the loins, the posterior face of the sacrum, the cristæ of the ilia, the front of the pubis, and over the whole of the anterior deficiency of the greater pelvis.

Were it always possible, the child's back, the corresponding parietes of the womb and abdomen, the stethoscope, and the ear of the accoucheur should not be separated by anything whatever, and they should constitute, as it were, a continuous body, without any interruption.

The nature of the cardiac sound, the only one recognized by MM. Mayor and Fodéré, being at once determined, did not become the subject of any controversy.

At first, it was thought to answer the purpose of ascertaining the precise position of the fœtus, but I, as M. Monod did, saw that the side of the chest transmitted it almost as well as the back. M. Bodson, who has devoted much time to the subject, maintained that, during labor, when the waters were broken, it was a means of ascertaining the life or death of the child, and consequently deciding, in difficult cases, whether it was necessary to interfere or not. The truth is, the sound of the heart is heard better when the bag of waters is broken than before labor, and is an evidence of the child being still alive; but, at the same time, it

is no less true that its power or feebleness is by no means always proportionate to the strength of the fœtus. Who has not seen the heart beat one or two hours in new-born infants which had to be restored to life by pulmonary insufflation, and who nevertheless died, respiration not having taken place. Besides, this sound may vary from so many causes that we would be liable to fall into serious mistakes, were we to take it for our guide in cases of deep importance. In addition to what MM. Kruhse, Reccius, Froriep, Ulsamer, Busch, Comins, &c., say in relation to this subject, we will find, in the valuable works of Hohl, a number of important facts connected with auscultation as applied to pregnancy, a work which is especially worthy of consultation on this subject.

Conclusions.—The sound of the heart is a certain sign both of pregnancy and of the child's being alive; its strength, in general, indicates the vigor and good health of the child; during labor, when accidents occur, or when a serious operation appears to be indispensable, its simultaneous existence at two opposite sides of the abdomen will render it certain that the womb contains two children; if met with in a woman whose uterus is but little developed, no doubt remains of there being an *extra-uterine* pregnancy; but its absence, like that of the active or passive motions of the fœtus, does not afford a conclusive proof that there is no gestation, or that the child is not living.

Far beyond this, doubtless, are the results furnished by Hohl; but I doubt whether the actual state of science justifies the further extension of our hopes. I shall conclude this article, however, by giving the practical results to which this author thinks he has arrived, relatively to the diagnosis of pregnancy. The signs rendered by auscultation, according to him, are

1st. *Fluctuation*, difficult to be detected, and on which he does not insist. He seems to attach importance to the perception of the placenta by percussion, and lays down rules for practicing it correctly.

2d. The *souffle*: and 3d, the *Fœtal pulsations*.

In multiple pregnancies, auscultation gives a stronger *placental bruit*, more extended, with a more decided buzzing; the *bruit* extends generally from one side to the other. If there be two placentas, there are *two bruits*. It is true that in simple pregnancies the placenta may cover a large surface, but it is almost always in cases of abortion or miscarriage; besides, in double pregnancies, the placenta will present two points where the sound is strongest; two hearts are heard. Where one of the fœtuses is dead, and the diagnosis obscure, the extent of the *bruit de soufflet* may assist it. If called after the birth of a living child, its extent, and the perception of fluctuation, would be additional signs to the ordinary indications. In case of triplets, the *bruit de soufflet* is still more extended; and as regards fœtal sounds, they merely show that there are more than twins, because they are confounded with each other. Place two watches along side of each other, and they can be distinguished from each other by the ear; but when there are three of them, it is no longer possible to do so. In *extra-uterine* pregnancies, there is necessarily a *bruit de soufflet*; it is more distinct, and is more readily distinguished than in normal pregnancies, and is without resonance. It is stronger in abdominal pregnancies than in tubal and ovarian pregnancies. The fœtal pulsations are likewise more distinct, and more precocious, than in *intra-uterine* pregnancies. These pulsations, besides, answer for diagnosing the continuance of the life of the child. If there be a new uterine or *extra-uterine* pregnancy, engrafted on the first, auscultation will be of great utility.

Auscultation, by causing the fœtal pulsations in the belly to be heard, will assist in detecting rupture of the womb.

Position of the fœtus.—The fœtal pulsations correspond with the place occupied by the chest. On the left, and below, in the first position of the occiput; on the right, and below, in the second or third position of the occiput; on the

left and above, in the first position of the breech; on the right and above, in the second position of the breech. The *souffle* corresponds with the anterior surface of the child.

These general rules are liable to exceptions. They are supported by about two hundred observations. Hohl was never able to recognize at first the second from the third position of the occiput. He had often remarked the moment the third changed to the second. In the mento-pubal position of the face, the heart beats in front. The position of the shoulder might also be ascertained by auscultation, if the touch left any doubts.

It has been remarked that very frequently in the same woman the same presentation occurs in different pregnancies.

Sometimes the anterior surface of the foetus does not correspond with the placenta. When the placenta and the foetal pulsations are heard on the left, the children are almost always in the first position; when at the right, it is the second changing to the third. In almost every case, there are circular turns of the cord about the neck. The author has observed that these positions are the result of a displacement during pregnancy, and that the cardiac pulsations are heard sometimes on the right, sometimes on the left, until finally they become fixed in the position they occupy at the time of labor.

Hohl laid it down as a rule that the child lived: 1st. When the foetal pulsations and the *souffle*, isochronal with the pulse, are heard equally strong and sonorous. 2d. When, during pain, the pulsations of the heart are very little diminished, and immediately after recover their force, and when the *souffle* is heard in the distance, and also recovers its rhythm directly afterwards. It is, on the other hand, feeble or diseased, when the second foetal beat is more distinct, when the pulsations are feeble and intermittent, trembling or unequal, too numerous or too much accelerated; when during the movements they discontinue, and do not recover their rhythm in the interval; when during pain the *souffle* disappears altogether.

The foetus is dead when the buzzing sound ceases, and when during pain the *souffle* is feeble or absent, when the foetal pulsations are wanting, no matter what the position of the mother may be.

Hohl maintains that it is always possible to hear the heart of the foetus when it really beats.

Until the seventh month the *souffle* is circumscribed, hardly perceptible, less sonorous, and the principal beats are farther apart from each other than at a later period. The pulsations of the heart are numerous, small, feeble, and confined to a smaller space than at a later period. The motions of the foetus do not impress these pulsations with such marked differences as during the last two months. This observation has been also made by Kluge.

In perforation of the cranium, auscultation is a means of ascertaining the death of the child.

In the Cæsarian operation, it is necessary that we should know if the child is viable and living. In symphyseotomy, says the author, when any one would be desirous of operating, it would be of equal importance.

In version, auscultation is useful in ascertaining the presentation and the life of the child.

With respect to the forceps, there are two things to be decided upon: 1st, the mode of application; 2d, the time. The mode of application depends upon the position. The touch in these cases is often deceptive; auscultation is then useful. Auscultation, by making known the condition of the foetal circulation, ought to enable us to defer, or to hasten the application of the forceps.

In the last stage of labor, auscultation points out the place of insertion of the placenta, and is useful in its artificial detachment. The lateral insertion is the best; and when it does not occur, we have reason to expect a difficult delivery of

the afterbirth. When, after one or two hours' attempt, the souffle continues to take place as in its normal state, we may still look for a natural delivery; but if the bruit has ceased, we must operate. If the bruit be connected with a whistling sound, as in cases of adhesion, it would also call for interference. Auscultation makes us likewise acquainted with partial detachment of the placenta.

§ III. TO DETERMINE THE STAGE OF PREGNANCY.

After having, by means of the simple touch, of *ballotement*, of muscular movements, or of auscultation, ascertained that there is pregnancy, it is still further useful, sometimes, to determine its stage; on this subject I shall not repeat what has already been said concerning the changes effected every month in the state of the cervix, the body and fundus of the womb; I shall content myself with remarking that, in order to obtain a just idea of these changes, especially those of the neck, it is often needful to *touch* in a different manner from that in which it is commonly done. In the first place, we are not to understand by the *neck* that portion merely of the womb that projects into the vagina, but rather all the cylindrical portion of the summit of the uterine ovoid, a kind of appendix which cannot be completely felt except by pushing back the vaginal cul-de-sac with the finger, in the centre of which is felt the os tincæ; in the second place, in women who have had children, we should make an allowance for the thickness of its lips; lastly, when the uterus is oblique in front, and the pelvis not very large, the orifice may be so high up that, in order to reach it, the radial side of the finger must be turned backwards, or the perineum somewhat depressed, while with the other hand applied upon the epigastrium, the fundus of the womb is thrust backwards towards the vertebral column. In other cases, particularly where the superior strait is very ample, the neck looks directly towards the interior surface of the sacrum; to touch here, we are obliged to carry the finger almost horizontally backwards, and then to bend it forwards in the shape of a hook; in other women, we meet, in the superior half of the excavation, a round tumor, in the posterior part of which the neck appears to be obliquely hollowed out like the ureters in the parietes of the bladder. With all these precautions, a skillful accoucheur can say what is the period of pregnancy within from fifteen to thirty days; but it would be dangerous to forget that there are numberless causes of error, and that we should never, before a court, give a decisive opinion until we have previously acquired a mathematical certainty of the fact concerning which we have to pronounce.

SECT. II.—MULTIPLE OR COMPOUND PREGNANCY.

It was natural to suppose that the uterus would be larger when containing two or more children than when it encloses only a single one. Hence, also, almost all those appearances that depend upon the pressure and displacement of the soft parts both of the pelvis and abdomen have been enumerated among the symptoms of compound pregnancy. But all that has been said on this subject throws but a vague light upon the question; varices, infiltration, œdema, swellings, difficulty in moving the lower limbs, engorgement of the labia pudendi, dyspepsia, difficulty in making water, in walking, breathing, digesting; an elliptical or flattened shape of the bag of waters; weakness of the uterine contractions; lipothymia and syncope; the belly being larger, rounder, rather depressed than salient along its median line; motions of the fœtus felt with more force and frequency, and on both sides of the abdomen at once, &c., all fail too frequently in twin pregnancies for us to place much confidence in them; besides, all these signs are rarely met with together, and a majority of them may be met with where there is only a single fœtus in the womb; which, further, may be easily imagined to be

the case, inasmuch as the size of the gestative organ may be much larger in some cases of simple pregnancy than in others where the gestation is evidently double or triple.

Baudelocque teaches that the touch is able to conduct us to more satisfactory results. He says, for example, that where the belly is very large, if there be only one foetus, the *ballotement* will be very easy; while, if there be two of them, there will, on the contrary, be some difficulty in effecting it, and that their motions or their most projecting portions can be distinctly felt through the parietes of the abdomen, in several places at the same time. It may be added that we ought to be able, by means of auscultation, to hear the sound of the heart at two places, at some distance from each other, and that if the pulsations denominated *placental* are of any use in obstetrics, they will also be heard at two distinct points.

The union of these signs would give us, without the least doubt, a certainty of the woman's being pregnant with two or more children; but the want of them is far from always constituting a negative sign of compound pregnancy. M. Désormeaux cites a case wherein the most manifest *ballotement* coincided with a very great size of the abdomen, and in which that able accoucheur could only detect a single foetus, while the ovum in fact contained two. On the other hand, the ear cannot detect the cardiac pulsations of two foetuses, when they are so situated that one is above or in front of the other, so that it is most commonly impossible, previously to delivery, to affirm whether the pregnancy is simple or double.

CHAPTER II.

OF EXTRA-UTERINE PREGNANCY.

SECT. I.—ANATOMICAL ARRANGEMENT.

WHEN the ovule becomes attached, grows, and is developed, without the uterine cavity, it must necessarily cause in the organism a disturbance and changes totally different from those it produces in uterine pregnancy. But, as the signs of gestation may vary at this time, according to the seat of the cyst, I shall not enumerate them until after having glanced at the different kinds of preternatural pregnancies.

ART. I.—OF OVARIAN PREGNANCY.

The animalculists, who supposed that the living corpuscles of the seed passed along the Fallopian tubes in order to join the ovule in the female seminal gland, did not attempt to contest the existence of ovarian pregnancy, and among modern practitioners there are few who think of calling it in question. Böhmer even thought he could divide it into external and internal. But this question appears to me to have been too lightly judged, and to deserve a new examination.

In whatsoever manner, indeed, fecundation is really effected, whether by means of an *aura*, an animalcule, or by any other principle of the semen, it must happen that the germs of the two sexes shall come in contact with each other; this contact cannot take place without a rupture of the covering of the ovary, and of the capsule of the ovule; so that, by the simple admission that an ovule is vivified, it can no longer be said to be enclosed in the ovary, unless we believe, with Chaussier, that the male germ reaches that of the female by means of absorption. A great many cases of ovarian pregnancy are to be found in the various *scientific collections*. An infinity of physicians and accoucheurs of merit have stated that they have met with them in practice; but it is easy, upon a moment's reflection, to perceive that not one of the cases hitherto published, not even those of MM. Doudement, Condie, Gaussail, and Bouchenel, prove undeniably that ovarian pregnancy has ever been seen. It is so easy in the dead body to confound this kind with abdominal pregnancy, those who have treated of them have given so few details, and pathological anatomy was at that period so little cultivated, that no result can in fact be obtained from the observations of the authors; and until the moderns shall have demonstrated with the scalpel that the ovum is sometimes really situated in the ovary and not in the adjacent parts, reason dictates to us that we should not admit the existence of ovarian pregnancy.

I have learned at my own expense how easy it is to be imposed upon in this matter. In 1824 and 1825, I met with the remains of extra-uterine conceptions in four different subjects; I removed the sexual parts with great care, and thought I was in possession of four facts in proof of the existence of ovarian gestation. I presented them to the *Société Philomathique*, where several members expressed doubts as to the possibility of the fact. MM. Blainville and Serres were good enough to assist at the dissection, which I performed the next day. We satisfied ourselves that three of these tumors were outside of the germiferous gland; we experienced greater difficulty in regard to the fourth, which did not exceed an

inch in size; but at length, after having completely isolated the Fallopian tube, we found that the *debris* of the conception was contained in a special sac between the peritoneal coat and the proper covering of the ovary, which was wholly distinct from it. Certainly, none of the facts that have been cited as proofs of the existence of ovarian pregnancy have been more carefully examined; and certes, if it had not been for the objections and the presence of an able defender of the opposite opinion, we should have remained convinced that the seat of the tumor was in the very parenchyma of the ovary.

In respect to this matter, there has been probably more discussion about words than facts. As regards myself, I do not pretend to say that the ovum has never been observed on the surface of the ovary, but merely that, when once vivified, it has never yet been found enclosed in the envelope of this organ, as in a cyst. In all probability, then, the advocates of ovarian pregnancy understood by that nothing but the growth of the germ in a ruptured vesicle, or on the circumference of the gland which produced it. If that be the case, there would be no difficulty attending the question, and all would soon be of one accord.

ART. II.—ABDOMINAL OR PERITONEAL PREGNANCY.

Admitting that fecundation is effected in the ovary, it is very natural that the vivified ovule should sometimes fall into the belly, instead of being engaged in the Fallopian tube; in reflecting upon the anatomical arrangement of the parts, one is disposed to believe that such accidents are not uncommon; if, says Bianchi, it does not occur more frequently, it is doubtless because a very great majority of the germs that escape in this way die before they become attached to the serous membrane that receives them. However, some modern accoucheurs have asserted that it cannot occur; that the peritoneum is not sufficiently vascular to supply to the germ the requisite means of development; that, in the instances in which dissection had shown the fœtus and its secundines to be in the abdomen, there had been previously a tubal or uterine pregnancy. It is true that the tube and the ovary are commonly, and sometimes a part of the uterus itself, are lost, as it were, in the mass of the tumor, and that it would be imprudent, in that case, to affirm that the ovum was not originally located in another place; but it is at the same time an incontrovertible fact that, in many of the published cases, both the ovary and the tube retained their natural condition, and were completely foreign to the sac which contained the fœtus. In fact, science possesses so many examples of it that it is useless to report the whole of them. I shall confine myself to relating only a few of them. Most pregnancies attributed heretofore to the ovary are evidently cases of abdominal pregnancies. The four observations of my own, for instance, are of this kind. The example reported by Saint Maurice, those of MM. Doudement, Gaussail, Moreau, etc., are of the same kind. In a female of Pont-à-Mousson, opened in 1662, the fœtus was found loose in the abdomen. In our time, M. Esquirol met within a cyst, totally disconnected with the genital organs, a petrified fœtus in the midst of the intestines, of a woman who died aged 77. A similar case, noted at the Hospital of Saint Antoine, was shown me by M. Gaide; and M. Mojon reported another case of the kind to the Academy in September 1833. To these cases, we must add that published by M. Pointe, in which the cord was seen inserted into the mesentery, and those cited by M. Arnault, that of M. Zais, who found the placenta attached in front to the spine, that of M. Bricheteau, and another in which the placenta was attached to the kidney and to the intestines. If objection should be made that, in some of these cases, the ovum could be deposited in the peritoneum only by a rupture of the womb, or Fallopian tube, which might have cicatrized afterwards, I shall answer, without hesitation, that for many, the opinion is untenable, and that there are cases still more conclusive to be met with. J. Cloquet saw in a cat, and

M. Michon in a rabbit, several fetuses engrafted on the internal surface of the peritoneum. A specimen exhibited to the Anatomical Society, by M. Cruveilhier, besides, would be enough to remove all doubt. The ovum and the fetus were deposited in the recto-vaginal excavation; the cyst was only a few days ruptured; the tubes, the ovaries, as well as the womb, were untouched. In the case reported by Mr. Ed. Porter, the placenta was inserted into the broad ligament, and the appendages of the uterus were left perfectly free. In the case of Thilaw, the fetus was of eight months. On the other hand, the veterinary physicians, more competent even than accoucheurs to solve this problem, have completely embraced the affirmative, relying on numerous and authentic facts that have been noted for thirty years past; besides, the difference between the structure of the peritoneum and that of the womb cannot in fact serve as a basis for any good argument. The ovum, which may be compared to the bud of a plant endowed with life that is still very obscure, is so constituted as to unite with the first living parts whereon nature places it.

The fecundated vesicle, soon covered with a velvety pile similar to the spongioles of the roots of plants, must rapidly contract adhesions with the surfaces on which it rests; there is an afflux of fluids to that point; appearances similar to those of a local and very circumscribed inflammation soon occur, and an accidental sac is soon organized around the little ovum, which is, so to speak, thenceforth protected against the action of the surrounding organs.

ART. III.—TUBAL PREGNANCY.

Tubal pregnancy, more common than any of the others, being as nine to three, according to M. Czihak, and the only one that has not been contested by the partisans of ovarian fecundation, could only be rejected by authors who believe that vivification takes place in the womb; but the cases on record are now so numerous that it is no longer permissible to entertain the slightest doubt in relation to it. Without mentioning those that are detailed in the works of Bartholin, Riolan, Portal, Dionis, d'Amand, Bianchi, Calvo, Duverney, and others; those in the dissertations of MM. Bry, De Bouillon, Bonnie, Daynac, Doudement, Arnauld, Hubert, and those related in the *Revue Médicale* (1826); those reported by MM. Vallerand, Ouvrard, Hoffmann, Wagstaff, Buschell, de Caignou, &c., and an infinitude of others that have been published in the *French and Foreign Scientific Collections*, I will state that in 1816 I saw, in the body of a woman who died at the hospital at Tours, a very perfect ovum in the second month of its growth, which was very completely enclosed in the outer half of the Fallopian tube, of which the root, the fimbriated extremity, the canal, and all the other parts were still easy to be recognized. Any one may see, in the Museum of the *École de Médecine*, a wax model which mathematically demonstrates the same thing. We may conceive, further, that, in this species of pregnancy, the product of fecundation may attach itself to any portion of the length of the tube, but that it will most frequently stop in the trumpet part of it, and that, after a certain lapse of time, it must be difficult to decide, at a glance, whether the pregnancy is tubal, rather than abdominal or ovarian. It may besides be conceived that the uterine duct, soon distended and thinned, might burst, and transform a tubal into a peritoneal pregnancy; so that the latter may, in fact, be either primitive or essential, or else secondary or accidental; but it is superfluous, with Boehmer, to describe both an internal and an external tubal pregnancy.

A woman who died at La Pitié, in the space of from six to ten hours in the month of February, 1834, and from whom a specimen was obtained by M. Dupré, interne of the service of M. Clement, has enabled me to prove anew the existence of tubal pregnancy, in the most perfect manner possible. The cyst, of the size of a nut, occupied the middle of the Fallopian tube. This passage was alone torn,

although the peritoneum was the seat of an effusion of several pints of blood. The ovule entire, granular, and without regular caduca, adhered throughout its whole circumference to the interior of the tube, but without continuity of tissue. The embryo, apparently a month developed, was seen with the cord across the membranes. The umbilical vesicle was not difficult to recognize beneath the chorion, and there was no caduca to be seen in the uterus. But this organ exhibited extreme attenuation, together with considerable puffiness and vascularity of its mucous tissue, as in polypi of the nose. This curious specimen was presented to a learned society, who allowed it to be lost, and a very incorrect account of it was published in the *Lancet* of Thursday, March 6th, 1834.

ART. IV.—INTERSTITIAL PREGNANCY.

The ancients made no mention of what M. Mayer has proposed to denominate *interstitial* pregnancy, though they appear to have had some idea of it. The case described by Mauriceau, and which he considers a hernia of the womb, and which caused B. Vassal, who reported it, and all the surgeons of Paris to favor tubal pregnancies, appears to me to belong to this variety. Noticed by Schmitt, Albers, Hederich, Carus, MM. Cluet, Bellemain and Lartet, Dance and Moulin, it had been studied with some care by Mayer and Meckel, in Germany; but scarcely anything had been said on the subject when M. Breschet, to whom MM. Bellemain and Lartet had abandoned the specimen which had served as the basis of their observation, undertook to collect all the known facts in relation to the topic.

The ovum in this case does not lodge betwixt the peritoneum or the mucous coat and the proper tissue of the womb, but in the very substance of the fleshy structure. In five out of seven cases, it has been found on the left side, above, behind, before, or below the tube, which did not in any case, as we are assured, communicate with the cavity that contained the production. It is at least certain that, in the one I had an opportunity of examining along with M. Breschet, there was no communication between the natural cavity of the genital organs, and the preternatural sac which contained the fetus. The case reported by M. Mérière, in connection with M. Dujardin, does not appear to me to give a clear view of the case. Dionis, Canestrini, Einsenman, Ramsbotham, and Rizza have each related a case which seems to be more like it. A case, long since reported by De la Borne, is more conclusive still. Baudelocque mentions a tumor situated in the posterior surface of the womb, containing a fleshy substance, and which might very well belong also to this kind of pregnancy. In fine, it is difficult not to admit it, in the case published by M. Gaide in 1830. I am not, therefore, of the impression, like M. Mondière, that we can call in question its existence, and say that the cases which have been reported of it probably arose from ulceration or rupture of the womb.

Attempts have hitherto been vainly made to explain the mechanism of this kind of pregnancy. M. Breschet has supposed that, when the ovule is about to enter the uterus, it might, upon meeting with some obstacle, engage in the open orifice of some one of the venous sinuses that open at the origin of the Fallopian tubes, and thus gradually insinuate itself into the very substance of the parietes of the womb. But, as these orifices have no existence in fact, the explanation falls to the ground of itself. On the other hand, admitting that the angles of the uterus, at birth, being very long, bear a partial resemblance to the horns of the womb or the *ad uterum* of quadrupeds, M. Breschet presumes that the narrow passage which then leads to the seminiferous tube might, by becoming obliterated, compel the germ to deviate from its ordinary route. But, if it be true that such a conformation is sometimes met with, I can at least affirm that it is rarely so, and is not according to the natural order of things. This, therefore, is

also but a gratuitous hypothesis. The same must be true of the passage discovered by M. Baudelocque, Jun., in the side of the womb, as well as of the preternatural cavities mentioned by Morgagni, Valsalva, &c. It is true, we may have recourse to anatomical varieties, to diseases, anomalies, to deviations of all sorts, and indulge in a thousand suppositions; but the wisest course is to confess, frankly, that the mechanism of interstitial pregnancy is wholly unknown.

ART. V.—UTERO-TUBAL PREGNANCY.

Here and there, in the annals of science, we find certain cases which tend to the establishment of this last variety of pregnancy, so arranged, that one part of the ovum is enclosed within the Fallopian tube, while the other is found in the uterus. Patune, who, I think, reported the first case of it, says that the placenta contained in the womb communicates, through the medium of the cord, with the fœtus, which has its location in the pavillion. Laugier refers to two cases, one of which was in his own wife. The fœtus had but one foot in the womb, the rest had to be extracted, as well as delivered from the Fallopian tube. Hay published another almost similar to that of Patune, the placenta being in the uterus, and the child in the tube. M. Herbin mentions a fifth in his thesis, and the case published by M. Mondat would seem also to be of the same kind. The head alone, in fact, was found in the uterine cavity, whilst the entire body of the child occupied the tube. Finally, Hoffmeister says he found in the abdomen the entire ovum, with a fœtus, the cord of which passed through the right Fallopian tube, to be inserted in the womb where the placenta was.

It would scarcely be reasonable, doubtless, to deny the existence of a pregnancy of this kind, merely because its possibility cannot be satisfactorily explained. But, as the examples that have been given of it do not altogether fulfil every desirable condition, and as, from the examination I have made of it, it would seem to me possible for a partial contraction, an accidental pouch, or even a rupture of the uterus of long standing, to lead to mistake in this matter, I think it is proper to defer admitting it under the head of a distinct pregnancy.

SECT. II. — PROGRESS OF EXTRA-UTERINE PREGNANCY.

ART. I.—CAUSES.

The density, the preternatural thickness of the covering of the ovule, or envelops of the ovary, too strong an adhesion of the germ, its being situated too deep or too near the ligament of the ovary, the obliteration, paralysis, spasm, bad direction, excessive or insufficient length, engorgement, or antiperistaltic motion of the Fallopian tube, inflammation and ulceration of its mucous membrane, induration of its trumpet end, or of one or more of its fringes, the contraction of its external orifice, all the changes and anomalies that this canal may exhibit, whether in regard to its conformation or its situation, a laceration of the womb, spoken of by Boehmer, Bianchi, and Weinknecht, may well have produced some instances of extra-uterine pregnancy; but it is certain that in this respect science is possessed of scarcely anything beyond probabilities. Astruc believed that unmarried women were more liable to be affected with this sort of accident than others. Kruger, who unites in this opinion, supposes that the ovule remains in the ovary, stops in the tube, or slips into the peritoneum, because fear, alarm, and indignation, by attacking women suddenly in the midst of the most lively enjoyment, or shortly afterwards, must occasion a disturbance in the whole organism, whose effects reach even to the sexual organs. A case by M. Lallemand, and another by Baudelocque, and a third by Bellivier, seem to lend some support to the opinion of Astruc. In fact, the extra-uterine conception in the three women who

were the subjects of it seems to have been effected at the very instant of a violent fright, occasioned in one by the remembrance of some piece of forgetfulness, and in the other two by a sudden noise which made them afraid of being caught in *flagrante delicto*; but as nothing similar has been noticed in other cases, this explanation can only be regarded as a tolerably plausible hypothesis.

M. Mojon thinks that the resistance made by the caduca to the entrance of the ovule into the uterus may also be the cause of it, and has related to me some facts in support of his supposition. It is not probable, however, that the greater number of extra-uterine pregnancies owe their origin to such a cause, and the wisest course is to confess our ignorance in the matter.

Those who insist that fecundation is effected in the womb necessarily reject all these modes of viewing it, and can give no account of extra-uterine pregnancy but by supposing a retrograde movement by means of which the ovule returns from the uterus into the tube, &c. The assertions of Planchon, who affirms that the tubes are slightly dilated in the first weeks of conception, and a remarkably curious case reported by Patune, in which it is said that the umbilical cord of a foetus enclosed in the fimbriated extremity was inserted into a globose placenta, situated in the very cavity of the womb, are very rare facts, and ought to be met with anew, before they can give much weight to such conjectures.

ART. II.—SIGNS OF EXTRA-UTERINE PREGNANCY.

The continuance of the menses, severe pains in the hypogastrium, nausea, and frequent vomiting, as well as several other distressing symptoms, considered as signs of extra-uterine pregnancy, sometimes, indeed, do accompany it; but as they also are oftener wanting, and not at all uncommon in natural pregnancy, their presence is, on that account alone, of very little weight. Though the breasts undergo no change, secrete no milky fluid; though the belly is uneven, its growth more rapid, and its development chiefly on one side; though the motions of the foetus are earlier felt, and through surfaces apparently very thin; though the womb remains quite small in some cases of extra-uterine pregnancy, the contrary happens in a still greater number of cases, and one or more of these irregularities is frequently met with even in simple pregnancy.

However, though it is true that the womb sometimes increases in size in such cases, it is equally true that the changes which it then experiences are seldom sufficiently marked to make us believe in the existence of a natural pregnancy, of four or five months' standing. If, therefore, the abdominal tumor has risen early above the marginal strait, and is found in one of the iliac fossæ; if it appears to be full of bumps, varicose, and if pulsations can be felt in it; if it be easy to feel the protuberances and motions of the foetus, while the parietes of the abdomen preserve nearly their natural thickness; and if, on the other hand, we can ascertain, by the touch, that the weight and size of the womb are not at all, or but slightly increased, that the cervix has not in any sensible degree diminished in length, although it has altered in respect to its position, direction, density, and even form, then it is evident that the pregnancy is preternatural.

Still it may be conceived that, although the ovum has fixed itself in some part of the periphery of the womb; or has been arrested very near the root of one of the tubes, between the fimbriated extremities and the ovary, as M. Doudement saw; or in the broad ligament, as Bergeret said he observed; or even in the substance of the parietes of the uterus, all these signs may in fact not exist, and the preternatural pregnancy be confounded with an ordinary gestation. In these cases, the uterus swells, softens, undergoes a major part of the changes that characterize real pregnancy. Its cavity sometimes becomes filled with a concretable matter which is amorphous, a kind of membrana caduca, or *anhistous layer*, observed by Bertrandi, Chaussier, and others, or rather with a vegetation of the

mucons membrane. The form of the belly and the motions of the *fœtus* exhibit nothing peculiar, and *ballotement* itself is not always impossible. Besides, if (which is rare) the extra-uterine pregnancy were double, as in the case reported by Mainal, the two tumors would evidently render its diagnosis easier than where it is single.

In general, the sexual organs depart but very little from their natural state, when the *fœtal* cyst is not within the tube, and contracts no adhesions with the womb. On this subject, the case noticed by M. de Bouillon should be regarded only as an uncommon exception. In these cases, the cervix rarely becomes much shortened, nor does its orifice dilate in any considerable degree. It is found to be much lower or higher, more forward or backward, or to one side, than the presumed period of the pregnancy would seem to indicate.

After all, neither the rational nor sensible signs suffice, until the end of the third month, to prove that pregnancy is extra-uterine. After this period, it will in most cases be possible, by means of some or all of them, to establish an almost certain diagnosis; the evidence derived from them will at least give rise to suspicions sufficiently strong to fix the attention of the practitioner.

The place occupied by the cyst is, moreover, of great importance in the diagnosis. When it is in the iliac fossa, or in the belly, we have on the one hand abdominal exploration, which renders it difficult to mistake it, and on the other the touch, which soon shows whether the uterus has experienced any alteration. On the front of the womb it will tilt the neck forwards, pushing it quite down, and will press on the bladder, and give rise to certain symptoms in that quarter, and will present the form of a tumor at the hypogastrium, at the same time that the finger introduced into the vagina will show but little increase of the gestative organ. In the recto-vaginal excavation, where it most generally attaches itself, as has already been shown by an observation of Saviard, extra-uterine pregnancy exhibits such marked characters, that it is very easy as a general rule to detect them after the third month. The cyst, being protuberant both in the upper part of the vagina and in the rectum, is readily recognized by the finger, which in certain cases is enabled even to distinguish the *fœtus*, and its different parts. Retroversion could only here be mistaken for it; but this will be avoided by recollecting that in the one case the *os tincæ* is at once raised up, and directed forwards, whilst in the other it is forced above the pubes with the womb which is discovered by the hypogastric exploration, and which continues most generally to look downwards. Between the uterus and the sacrum, and on a level with the strait, we would have a falling and inclination of the neck backwards, it is true; but, as the shortening of the *os tincæ* and the changes of the rest of the organs are not observed to be in equal proportion, it will be still easy to avoid the mistake.

As to the distinctive signs of the different species of *extra-uterine* pregnancy, I do not think it would be useful to treat of them in this place; the knowledge of them could not be beneficially applied; besides, all those that have been mentioned are too uncertain to deserve the least confidence: since, even on the dead body, we can scarcely decide, even by means of the scalpel, whether the ovum is situated in the tube, the ovary, or the peritoneum, it would be in some measure ridiculous to desire to obtain any certainty in relation thereto on the living subject.

ART. III.—TERMINATION.

Extra-uterine pregnancy commonly terminates before the fifth month. Martin, Turnbull, Baudelocque, MM. Arnault, Novara, Delisle, Rensi, Zais, Moreau, and some others, have nevertheless seen it much more prolonged, and even to the term of ordinary gestation. These authors, especially Turnbull, as well as Cyprianus and Wilmans, mention a very remarkable circumstance; it is that in these cases, at

the close of a kind of labor, attended with intermittent pains, that are sometimes pretty strong, a commencement of dilatation of the neck, a discharge of mucus, of a bloody fluid, and what seems still more surprising, very regular contractions of the womb or of the foetal cyst, are observed to take place. In fact we may conceive of a part of these phenomena in tubal pregnancy; the tube being composed of the same elements as the womb, it is quite natural for it to enjoy the same properties; but, in abdominal pregnancy, we can only account for the contraction of the cyst by supposing that there has been a development of fleshy fibres in its parietes, at the cost of the elastic cellular layer which is enclosed in the peritoneum of the pelvis.

Interstitial pregnancy alone admits of a possibility of extracting the foetus by the natural passages. The calibre of the tube, and its slight dilatability, do not allow us even to think of it in the other species. In this view, therefore, extra-uterine pregnancy is always dangerous, both for the mother and child; its natural terminations are the death of the foetus, and rupture of the cyst.

§ 1. DEATH OF THE FŒTUS.

It is rare for the foetus to continue alive beyond three or four months. After its death, which happens for want of nutrition, or in consequence of inflammation of its envelops, 1st, it sometimes happens that the liquor amnii, as well as all the other fluid portions of the ovum, are absorbed. The child hardens, petrifies, as is seen in the case of d'Amand, or is transformed into *gras de cadavre*. The cyst contracts, thickens, and becomes fibrous, fibro-cartilaginous, or even osseous, and the whole resolves itself into a solid tumor, which may remain in the abdomen for an indefinite period, without compromising the life of the woman. In the case quoted by Van Swieten from Camerer, the abnormal body was so hard that it required an axe to cut it. The foetus found in the abdomen of so many women by MM. Esquirol, Gaide, Mojon, remained there at least thirty years. And, 2d. The sac is transformed into a real suppurating cavity; the foetus is decomposed, dissolved, or putrefies. And then the cyst opens either into a mucous cavity or directly outwards, if not immediately into the peritoneum. It opened into the bladder in the patient referred to by Van-der-Wiel, in another individual whose case is reported in the memoirs of the Academy of Dijon, in one of those mentioned by M. Doudement, that related by M. Wilmans, and in the person of whom Hamlin speaks. The opening took place in the groin in the case of M. Cohen; at the umbilicus in the case of Glodat; and in another, M. Cuning saw it open at another part of the abdomen, and M. Heiskell in the epigastrium. It is not at all unusual for the cyst to empty itself into the alimentary canal, and in this way might be explained those pretended pregnancies of the stomach, or those examples of foetuses expelled from the stomach during the act of vomiting, of which some authors speak. There is no question, however, but those cases in which the product of conception is expelled *per anum* belong to this class; and finally, we can understand that it may rupture the superior and posterior part of the vagina.

3d. Sometimes the ovum becomes merely filled with a fluid which is more or less thick and transparent, of a yellow, brown, gray, or reddish color, but not purulent: or it is converted into a cyst, in which as much as one hundred and fifty pounds of fluid have been found, and containing the debris of a foetus; an instance of which is reported by Vassal.

The first case is the most fortunate of all; with it should be classed most of those pretended pregnancies that have been said to last two, four, ten, fifteen, twenty, thirty, and even forty years; the second is always accompanied or followed by serious symptoms; inflammation is propagated to the circumjacent parts, gives rise to violent fever, and sooner or later brings on a fatal termination; the patient most commonly becomes hectic, for she is exhausted by an abundant suppuration; sometimes, also, all the parts of the foetus escape one after another; the

sac is gradually emptied, becomes clean, and contracts; the suppuration ceases by degrees, and the wound at last closes, or at least is reduced to the state of a fistulous ulcer, which is rather more troublesome than dangerous. This took place in the cases of Wilmans, of Riva, of Bonnie, of Littre, of Boogaard, of Harrison, and an infinity of others. As in the case of petrification and degeneration of the fœtus, extra-uterine pregnancy frequently allows new normal pregnancies to run through their whole course without any dangerous symptoms. Middleton has reported examples of it. Detwiller and Drake have referred to other cases of the kind, and the *Revue Médicale* mentions one where the presence of an extra-uterine cyst in the excavation did not prevent three successive pregnancies from taking place. It was the same in one of the cases mentioned by M. Daynac.

§ 2. RUPTURE OF THE CYST.

Every species of extra-uterine pregnancy may terminate by the laceration of the ovum, and of the sac which serves in place of a womb. Examples of this kind have been noticed both in interstitial and abdominal pregnancy; but tubal pregnancy most frequently terminates in this way. Although very extensible, the parietes of the tube are, nevertheless, too thin to admit of the enlargement of the cyst beyond the third or fourth month. The case of Portal is a proof of it; in like manner those of MM. Buschell and Wagstaff. In some instances, the rupture occurs suddenly, as in the case of the woman we saw at La Pitié, and seems to be occasioned by some exertion, or fall, &c.; sometimes, on the other hand, it is effected and prepared for by slow degrees, by the mechanical thinning, the softening, or some other change of a portion of the fœtal sac.

In all cases where no preservative adhesions have been formed, the water of the amnios, the fœtus, and the blood that flows from the lacerated surfaces pass into the cavity of the peritoneum; lipothymia, syncope, convulsions incessantly repeated, and intolerable pains, often carry off the sufferer in a few hours; in others instances, vital resistance does not so readily yield; a violent peritonitis comes on, and death succeeds on the second, third, or fourth day. Finally, in some rare cases, nature, with proper assistance, resists the first dangers of this redoubtable tempest, and a protracted inflammation permits the effused matters to accumulate in a more circumscribed space, and give birth to a real abscess, which may still leave some chance for saving the patient.

SECT. III.—TREATMENT.

The impossibility of certainly recognizing the nature of extra-uterine pregnancy, in the first months of its existence, is the reason why attempts to remedy it are scarcely ever made until the occurrence of symptoms announcing the death of the fœtus or rupture of its coverings. Besides, the powers of art are so limited in these circumstances that the only assistance which it is possible to afford would be almost as dangerous, in itself considered, as the natural terminations of the affection; nevertheless, it would be wrong, in many instances, to remain passive. If the cyst opens spontaneously, either outwards or upon the surface of a mucous membrane, it may be of advantage to enlarge the opening. If it remains whole, and is only prominent above the strait, gastrotomy is indicated. Finally, the operation is readily performed through the vagina, or through the anus, when it occupies the recto-vaginal excavation.

ART. I.—BY INCISION.

As it is almost impossible for the cyst to open anteriorly, without previous inflammation, adhesions, generally very extensive, ordinarily surround the opening;

it is therefore possible to detach it considerably without opening the peritoneum, the only thing preventing it being vessels of certain size, or the neighborhood of some important organs. A large opening, having the advantage of facilitating the extraction, or the escape of several parts of the fœtus, and giving free issue to the accumulated matters in the cyst, should then be made, whenever the part opened admits of it. It is a large abscess that requires to be emptied and cleansed out, in the most expeditious and perfect manner possible. In those cases where extensive incisions would expose the individual to great danger, the multiple detachment, such as has been proposed by M. Vidal for stone and hernia, should be adopted in preference.

Should parts of the fœtus have entered the bladder, and catheterism satisfied us of it, we must resort to the operation for stone, either at the hypogastrium, as has been done in England, or through the vagina, as has been performed by M. Flaubert.

ART. II.—GASTROTOMY.

Gastrotomy, the only remedy that has been proposed in certain kinds of extra-uterine pregnancy, already furnishes some successful cases. Besides those reported of it by Donatus and Cyprianus, science at the present time possesses those of MM. Novara, Hoffmann, Zais, and Buth. In the case of M. Heim, the woman died, but the child was saved. The woman, on the contrary, recovered in the case of Ring. In the case published by M. de Bouillon, the woman survived eighteen days. And M. Müller says he saved both mother and child by operating in this manner. The fears of Levret and Sabatier, in regard to hemorrhage, suppuration, and wounds of the peritoneum, are evidently exaggerated. It would seem, *à priori*, that gastrotomy ought to be much less frequently fatal than is commonly supposed.

On the other hand, although we have no right to invoke past experience in its favor, we should not forget that, having been hitherto performed in despair of all other assistance, we have no reason to be surprised at its not having prevented death from taking place. I think, therefore, with M. Désormeaux, that, if recourse were had to it early, before the formidable array of inflammatory symptoms have developed themselves, before peritonitis becomes of itself mortal, a considerable number of women might be saved.

It has been maintained that in all cases it should not be had recourse to until the seventh month of pregnancy, unless it be certain that the fœtus is dead, and the cyst opened, either into the peritoneum or externally; that otherwise, we should, without advantage to the mother, sacrifice the life of a child, which we might possibly have conducted to its full term, and rescued alive. This reasoning is good for nothing; the chances of success in the operation are so much the more numerous in proportion as the pregnancy is less advanced; in this case, there is too little probability of the future life of the fœtus for it to be balanced against that of the mother. After seven months, when the child is *viable*,* reason and humanity both dictate its performance without hesitation. Even although the accoucheur should not arrive until after the rupture of the cyst, he should still instantly open the parietes of the abdomen. With the operation, death is but too probable; but without it, it is nearly certain. It is well, moreover, to remark that the cyst seldom acquires any size without contracting adhesions with the part corresponding with the walls of the abdomen, and even if the adhesions should not exist, we can very generally produce them by means of long-continued

* I have left this word untranslated; it expresses that state of development in which a child *may* live, when independent of its connection with the mother. I trust the reader will pardon me for introducing it here, especially as it is getting much into use among the profession in this city.—M.

pressure, and if there should be any fear in this respect, we possess a remedy in the adoption of the method of Graves for emptying abscesses and morbid cysts of the abdomen. Thus, in place of performing the operation all at once, it should be performed at two distinct periods; the first should include the incision of the skin, the muscles, and aponeuroses, as far as the peritoneum; the second should not take place for eight or ten days after, and have reference to the opening in the cyst. In the interval, the tumor, having nothing to resist it from without, will become more or less engaged between the lips of the wound, and will occupy the space in such a way as to render the second incision every way free from danger.

In cases where gastrotomy is not applicable, we must be content to prescribe for symptoms; to moderate the violence of inflammation; to prevent, as far as possible, the formation of pus; to favor the production of adhesions, so as to circumscribe the effusion; to sustain, or else to diminish the strength by means of regimen or blood-letting, according as the appearances of reaction or exhaustion may seem to require.

§ 3. INCISION PER VAGINAM.

The most frequent of the extra-uterine pregnancies, I think, is that which has its seat in the excavation between the rectum and the vagina, either from the ovule's originally attaching itself at this point, or from descending with the tube or ovary. As a general rule, the opening of the cyst is easier and less formidable than gastrotomy; unless there be some particular contra-indication, the most convenient place for operating is through the vagina. Baudelocque recommended it; then Guérin, M. Delisle, De Valognes, and M. J. Kiner performed it in 1818. Norman and M. de Caignou performed the same operation—the latter in a woman I saw with him. M. Grandval reports a case of the same kind, and in which it was thought necessary to apply the forceps to the buttock of the fœtus, the head of which was extracted with difficulty. It was through this part also that MM. Gresely and Bouchenel made an opening each in a different case, but confining themselves to a simple puncture. One of these women died of hemorrhage; the other had acute peritonitis four days from the time of the operation. In the patients of MM. Gresely and Bouchenel, the cyst was not entirely emptied. The child has been extracted alive three times. Although the head and the feet are too much confined in the excavation, they generally rise above the strait, and are still readily distinguished through the posterior wall of the vagina. I think it would be better to operate before the manifestation of any serious symptoms than wait the appearance of labor. The opening should be large. In effecting the delivery, I would wait until the placenta was in a great measure detached so as to avoid hemorrhage.

Should the vulva be closed, as in the case related by M. Bonnie, the anus must be penetrated, and not the vagina. We see by the cases of Littre, Guillerme, Giffard, Vaughan, Willmans, Ouvrard, that of Planque, that of Lucas de Saint-Lô, that of Riva, one of Duverney, those of Boogaard, and Rensi, that taken from the newspapers of Brazil, that of Bergeret, and an infinity of others, that the remains of the fœtus have been extracted through the rectum, and that several of the women recovered perfectly after the operation. However, as it would be more difficult to deliver a living child in this way, the vaginal incision is evidently preferable when it can be applied.

Finally, when, in our opinion, neither of these operations ought to be adopted, and the cyst opens at one of the points designated, we must assist the escape of those portions of the ovum which present themselves in the vagina, the bladder, or the rectum. If abscesses form, they must be opened; and we must prevent the stagnation of pus or of any matters in a state of decomposition; in one word, we should put under contribution, one after another, according as they may be

indicated, baths, injections, enemata, a severe diet, an analeptic regimen, general or local bleeding, and rest or exercise.*

* Inasmuch as the diagnosis of extra-uterine pregnancy can in no case be absolutely clear and undeniable, the question of gastrotomy is one of the most difficult that can be presented to the surgeon. While the woman continues to enjoy even a moderate degree of health, I think few surgeons could be found bold enough to recommend or effect the incisions requisite for the extraction of the fœtus; the more particularly, since the patient may, as in many examples has been shown, continue to live for ten, twenty, and even fifty years, without great suffering or discomfort, and as she enjoys the further prospect of getting rid of the difficulty by suppuration, and the other modes pointed out by M. Velpeau. A Cæsarian operation would be far less dangerous than a gastrotomy for extra-uterine pregnancy, because the contraction of the womb after delivery, by the Cæsarian section, obviates the great danger of internal hemorrhage; a circumstance which cannot be predicated of the incisions into an accidental sac containing the extra-uterine fœtus. For a very excellent paper on uterine pregnancy, see Dr. James' article in *North Amer. Med. and Surg. Journal*, vol. iv. p. 275. —M.

PART II.

OF FALSE PREGNANCY.

NUMBERLESS cases prove that various diseases may give rise to a belief in the existence of pregnancy in women who are not gravid, and *vice versâ*. A woman of the Faubourg Saint-Marceau was with child, says M. Désormeaux; certain impudent quacks plunged a trocar into her abdomen, and she died in a few hours afterwards. I was called in consultation to a lady, in order to decide whether it was necessary to perform the Cæsarian operation; the patient was affected with peritonitis, of which she recovered, and a scirrhus ovarium of which she died! It is useless to invoke the rules of art against errors so gross; but there are cases so obscure that the most skillful practitioner may easily mistake their true nature. M. Lefebvre, in his thesis, has shown that even animals pretty frequently exhibit similar anomalies.

Retention of the menses, ascites, or encysted dropsy, tympanitis, polypi, scirrhus, cancers of the womb, tumors in the ovaria, the tubes or the pelvis, and other lesions besides, often produce a major part of the rational signs, and even some of the sensible signs of pregnancy. However, one must be very inattentive or inexperienced, not to avoid mistakes in almost all these cases. False pregnancy always arises from some functional disturbance or alteration of the uterus, and is divided into three kinds: 1st. False pregnancy from deranged menstruation; 2d. False pregnancy from lesion of the womb or its appendages; 3d. Nervous false pregnancy.

The least difficulty in the diagnosis is found in the second kind.

Who can confound the symptoms of scirrhus of the cervix, and ulcers of the uterus, with the phenomena of gestation, after having touched the woman? Is not the presence of a polypus most commonly accompanied with hemorrhage? Does it ever admit of *ballotement*, or make us believe that we feel the spontaneous motions of a fœtus? Do the progress of the affections, the state of the cervix, &c., in any case resemble those of natural pregnancy?

ART. I.—RETENTION OF THE MENSES.

The accumulation of menstrual fluid in the gestatory organ may indeed impose upon us notwithstanding, for it has frequently been mistaken for true pregnancy.

Signs.—But if the womb is filled with *blood*, the touch shows that the hymen is imperforate, and that the vagina or some other parts of the genital organs are in an abnormal condition. If the woman is married, or if the menses have been previously regular, there will in general be found at the same time more or less numerous indications of disease which clear up the diagnosis. The swelling of the abdomen is irregular; sometimes it decreases for a month, and then again suddenly increases in size. The menstrual period is generally accompanied with severe colic, and no matter how large the uterus may be, we never observe any ridges, or any solid part, by the abdominal exploration, nor is there any double beat or *bruit de soufflet* on auscultating.

Treatment.—An operation is the only remedy against a misfortune of the kind, if it arises from occlusion of the cervix, as in the cases observed by Dance and M. Prus. We can make use of a long thick trocar for the puncture, or even a simple straight bistoury protected to near the point with a small bandage. A piece of lint, or, what is better, a gum elastic catheter, is then to be left in the wound for some days. However, as the fluid contained in the womb is almost always syrupy or full of clots, and cannot always escape through a puncture, I think the surest plan is to make a good-sized opening with a sharp instrument.

If there be occlusion of the vagina, including some extent of this canal, the operation is not unattended with danger; the distension of the part with blood, however, renders it less difficult than when there has been no retention of the menses. Nothing further is necessary to be said on the subject more than what has already been mentioned when speaking of malformations of the vulva.

When there is merely a sort of diaphragm, as in the case of which De la Motte speaks, a simple stroke of the lancet or bistoury will answer the purpose; but it is better to carry the instrument on each side of the part divided, so as to have a radiated incision.

The obstruction is most frequently met with at the vulva. The blood then ordinarily occupies the vagina, and not the uterus, which is found pushed above the strait in the form of a small tumor. From this arises the ischuria referred to by M. Coley. For many years the old woman of whom Bérard has published the case was in this condition, and those of whom Schenk and Siebold speak, and I have met with it also in two different individuals. The quantity of fluid drawn by incision in cases of the kind is sometimes considerable. Eight pounds were obtained in the young girl who was thought pregnant, and was operated on by Uvier, physician to the Duke of Cleves. There were four pounds in the case cited by Denman, and four pints in that of M. Cabaret.

Besides, the membrane has been seen to rupture and the blood to flow spontaneously. M. Allaire reports a curious example of it, observed in a young girl eighteen years of age. In another, the tumor, bluish and soft, was so salient exteriorly, that Macaulay took it at first for the bag of waters. The operation should be performed as soon as the cause of the evil is ascertained, and whenever the woman gives her consent to it. The facts related by Fabricius, Saviard, Smellie, Magnan, MM. Paul, Toulmouche, and Gendron, prove, like those of Amand, that it has often been followed with success. It is true, however, that death took place in the case of which Platner speaks, in that of De Haën, and in one of those referred to by Denman.

Having placed the patient in the position for the operation for stone, with the parts carefully separated, the point of the bistoury is plunged in, provided the membrane seems thin, and the tumor points outwardly. But when this is not the case, the opening should be made by small strokes of the bistoury from without inwardly. The incision should be large, and crucial or radiated, rather than simple. It would be well, perhaps, to remove some pieces of it, as Celsus recommends, when there is any apprehension of its closing up, and then to pursue the same course as when it is necessary to prevent the closing up of a large abscess. The finger should be carried as far as the cervix uteri, for the purpose of ascertaining the condition of the vagina. A patient in whom the hymen had been incised, continuing to suffer, was again examined, and there was found near the neck a kind of perforated diaphragm, which was freely divided, and a perfect cure was the result.

ART. II.—DISEASES OF THE UTERUS AND ITS APPENDAGES.

In the case of *hydrometra*, we are in possession of the same resources. The local affection is accompanied with so serious a change in the general health,

that, with a little reflection, error becomes, from that very circumstance, almost impossible.

In *uterine tympanitis*, the womb may acquire a considerable size, but it always remains very light; there is no *ballotement*, and percussion of the belly occasions such a resonance as at once to remove all uncertainty.*

Encysted dropsy, fibrous or scirrhus tumors, any unnatural growth in the ovary or parts connected with the womb, might, at most, be confounded with extra-uterine pregnancy, inasmuch as the neck in those cases undergoes only very slight changes; the want also of the positive signs of the presence of a child, the general state and progress of the affections, will always suffice to prevent us from asserting that there is one, and frequently will lead us to maintain that there is no gestation in the case.

As to *ascites*, peritoneal tympanitis, effusions of pus or blood in the abdomen, encephaloid, fibrous, scrofulous, steatomatous, or any other kind of tumors, and the various lesions of organs contained in the belly, they are so many diseases or symptoms of diseases, which only resemble pregnancy in the distension of the abdomen they occasion, and a few other still more inconclusive signs. If the peritoneum is distended with gas, percussion will show it at once to be so; in ascites, the fluid, falling to the lowest places, according to the laws of gravity, will give to the belly a form too readily distinguishable from that of pregnancy, for these two states to be confounded, and the difference is still greater in all the other affections that I have just now mentioned. But if it is true that, with attention, an educated physician can avoid every mistake in a case supposed to be advanced pregnancy, we must also at the same time admit that, until the third month, the diagnosis is by no means always easy. A case of hydrometra, and another of uterine tympanitis, which terminated by a noisy expulsion of gas, reported by De la Motte, are proofs of it. The second, fifth, fifteenth, and nineteenth cases of Schmitt bear witness to the same fact. For my own part, I have seen most of the signs of pregnancy terminate suddenly at the third month, by the expulsion of a glassful of serous matter in a lady of thirty-one years, who had already experienced this thing three times.

ART. III.—NERVOUS PREGNANCY.

The group of symptoms known as *nervous* or *hysterical pregnancy* has most frequently been the cause of error on this head. It is most frequently met with about the period of cessation of the catamenia, or in unmarried women of an irritable or nervous habit, in such as, having lost their first children, are much tormented with a desire of having more, or those who have remained several years in a state of widowhood, and think that they have been fecundated by a second husband. The menses are suppressed, nausea, qualms, changes in the breasts, in the digestion, and sometimes all the rational signs of pregnancy supervene, and now and then the woman goes so far as to say that she feels the motions of the child quite

* I seize this occasion to say that I cannot admit the existence of uterine tympanitis as a disease proper.—It is not possible to retain air within the cavity of the womb without the aid of a tampon of some sort. There is no ground to believe in the existence of such a malady.—Nevertheless, in some women, air is occasionally discharged with noise from the vagina, as I can witness, having repeatedly heard it myself in several different individuals; but this only takes place upon some sudden motion, as stooping, &c., and it consists in the expulsion of air, not from the womb, but from the vagina. The uterus is sometimes higher, sometimes lower down in the same woman: when it rises upwards, as upon lying down, air enters the vagina and is retained there, until, upon some sudden effort of the woman, it is forced out again, in consequence of the womb being again forced downwards by the movement of the body or change of attitude. I have also witnessed the discharge of volumes of fetid air from the womb, upon the forced removal of a putrid and crepitating placenta. But this is a case of accidental distension—and not a real case of disease worthy of the title tympanitis uteri.—M.

strongly; and what is more, there have been skillful accoucheurs who have partaken of the error. According to M. Orfila, Professor Dubois was not afraid to confess that he had himself been deceived. Russel speaks of a woman who had all the symptoms of pregnancy, suppression of the menses, swelling of the belly, breasts filled with milk, and motions of the fœtus, and who was relieved of it, at the end of nine months, by a hemorrhage; and for a period of twenty years, the same phenomena returned, in the same manner, every nine months. On post-mortem examination, the genital organs were found in a natural state.

A lady, thirty-eight years of age, who had had no children for twelve years, and who would have given the world to become a mother by the man with whom she was associated, sent for me, in 1823, to prevent an abortion with which she thought herself threatened. According to her account, she was four months gone with child; the size of her abdomen, and numerous sympathetic phenomena seemed to confirm her assertions; she had felt the motion, and the slight discharge of blood that alarmed her had been provoked by violent exercise. After two or three days, her fears were quieted; but they recurred again two months later. New hopes again succeeded. The period so ardently desired arrived at last; labor pains came on; a skillful midwife repaired to the woman, who was overwhelmed with joy: three days passed away in pretty severe suffering, without appearing to advance the period of delivery; I was called upon; I examined her, and found the cervix as well as the body of the womb in a natural state. I pronounced her to be not pregnant; she became enraged; I was dismissed, and learned four days afterwards that her belly had fallen, that nothing had passed out from the sexual organs, and that the woman's health was restored.

Among other cases of the same kind, Mauriceau relates that of a woman, aged fifty-five years, who, after having engaged a midwife, and made every necessary arrangement for confinement, felt the signs of labor at the tenth month, but she was entirely relieved by the escape of gas and water. Smellie speaks of a woman whom an accoucheur absolutely wished to deliver, but who was not pregnant at all. Schmitt, whose book contains so many interesting facts, speaks of a lady who was so convinced of being *enceinte* that she had prepared the baby linen, and could not be induced to think otherwise, until after the term. Another, who, in twelve previous accouchements, had said, without fail, "*I shall be confined on such a day*," thought she was in her thirteenth gestation, and announced the fifteenth of May as her term. On the day fixed upon, she had pains and convulsions; an examination was made per vaginam, and she was found to be not pregnant. In order to satisfy her of it, another physician was called. The illusion then ceased, and three hours afterwards, her health was perfectly re-established. The same author also mentions the case of a young married woman, and the nurse, who both fell into the same mistake.

ART. IV.—CONCLUSIONS.

Upon the whole, apparent pregnancy depends: 1st. On mechanical retention of the menses. 2d. On some irregularity of the menstrual function. 3d. On some affection of the womb. 4th. On a lesion of the Fallopian tubes. 5th. On diseases of the ovaries. 6th. On some affection of the abdominal viscera. 7th. On some affection of the pelvis. 8th. On a condition impossible to specify, and which includes pregnancies purely imaginary, hysterical, and nervous.

In almost all these cases, the touch, in conjunction with abdominal exploration, will be sufficient to destroy the illusion; but to such a degree do patients cherish their error, that most frequently they are unwilling to be examined, and more particularly as they entertain not the shadow of doubt as to their condition.

The very reverse happens, however, in those who dread becoming pregnant. A lady, aged twenty-six years, whom I had treated for a blennorrhagia three

months previously, came twice to consult me, in the month of November, 1833. Afraid that she was so from the size of her belly, the motion she felt in the hypogastrium, and other rational signs of pregnancy, the cessation of the menses excepted, she ought to have been five months and a half gone; but a careful examination satisfied me that the womb was not at all enlarged, and the sequel confirmed the diagnosis.

The *treatment* of false pregnancy must necessarily vary according to the organic or functional alteration producing it, and cannot be well explained in this work. I shall merely remark that, in hysterical, nervous, or imaginary pregnancies, that is to say, without appreciable material lesion, warm baths, frequently repeated, are one of the means most certain of success. At the same time, it must be admitted that most frequently nothing will prevent this group of symptoms from continuing during the whole period of natural pregnancy; and before their disappearance, they frequently become connected with some of the symptoms of real labor.

If so many diseases can be mistaken for pregnancy, it is possible, also, that pregnancy, in its turn, may be mistaken for various diseases. Scientific works are filled with cases of the kind. A woman, who had been treated for several months for congestion of the liver, in a clinical hospital, was one morning suddenly cured by being delivered, to the great astonishment of the professors, who had made her case the subject of several lectures. In another, the pregnancy was marked by disease of the ovary; a similar case occurred in a large hospital of Paris; and what practitioner is there who does not possess cases more or less analogous? The great matter is to suspect its existence, for after the fourth month it is almost impossible to make a mistake. At present, however, French practitioners have become so circumspect that they no longer expose themselves to the reproaches cast upon certain midwives of his day, by Mauriceau, for pronouncing, for example, a woman who was condemned to death not pregnant, although she was five months gone, and for maintaining that one had not reached the ninth month, notwithstanding the most positive signs, as the accoucheur did of whom Schmitt speaks, and as is seen in the case of M. Moronval.

I do not here treat of molar pregnancy, nor hydatid pregnancy, because moles and hydatids of the womb, being nothing but products of unnatural conception, give rise to the same phenomena as natural pregnancy. I shall have occasion to speak of them elsewhere, as the cause of *fausse couche*, or abortion.

PART III.

SEX OF THE FŒTUS.

SECT. I.—IS IT POSSIBLE TO ASCERTAIN THE SEX OF THE FŒTUS DURING PREGNANCY?

WHEN we reflect on the powerful and various reasons that should lead man to seek in the future for what may subserve or disturb his interests and his passions, the desire of knowing the sex of a child still inclosed in the womb of its mother surely seems to be quite legitimate. The woman who becomes pregnant rarely fails to attach an idea of greater happiness to one sex than to the other. In the most common conditions of social life, the husband himself is often tormented with the same inquietudes. If to this sentiment, which is so general, be added the fears of a whole family threatened with extinction for want of heirs male; the alarm of a whole people; the various clashing designs of all nations united by the bonds of civilization, when the reigning dynasty of a great empire has no hope save in the being who is as yet unborn, we shall comprehend the efforts that have in all past time been made to satisfy public curiosity on this head.

The gods, diviners, and sorcerers have in turn been consulted: at Rome, Livia had patience enough, assisted by her women, to complete the incubation of an egg with the warmth of her hands; being persuaded that, if a male was hatched from this egg, the child with which she was pregnant would be a boy, and that the reign of Augustus might thus be continued. The Egyptians and Indians depended on the state of the heavens, or on the nature of the constellations, at the moment of fecundation; the Greeks, and all the people of the ancient world, used to rely upon the phases of the moon, &c. But, unfortunately, there is not one of these auspices which has not deceived the credulity of man.

Founding on the debatable principle that the male embryo is sooner developed than the female, Aristotle pretends, as well as Hippocrates and many other ancient authors, that the woman quickens earlier with a boy and later with a girl. Setting out with the same idea, the relative strength of the fœtus has been transferred to the mother. It has been said that she feels more vigor, activity, gayety, contentment; that her eyes are more lively, her face more blooming, *Si marem gerit, bene colorata est*, her pulse larger, more frequent, and her digestion easier; that all her functions, in a word, are executed more freely when she is to bear a male child, than when she is pregnant with a female; that a brown or black ray along the median line of the belly, greater strength, livelier color, nipples more prominent, a harder and tenser breast, stronger pulsation of the carotids, veins larger on the right than on the left side, announces the presence of a boy; that, in getting up or walking, the woman advances the right knee or foot first; that the womb is inclined to the right, that the urine is constantly loaded, that it deposits a lateritious sediment, if there be a male child: and that opposite phenomena are observed when it is of the female sex.

I do not think it needful to combat in a serious way the reasons by which physiologists and physicians have supported these assertions; I should not have deemed it worth while even to mention them, if they had not given rise to a

crowd of prejudices that are spread among the vulgar, prejudices which the quacks make the most of, and which the ablest accoucheur is sometimes compelled to manage as well as he can, when unable wholly to destroy them. I shall content myself with observing that the several phenomena I have just now enumerated have been, and continue to be met with every day, as much, and not more for one sex than for the other; that what passes as indicating a boy, Osiander, relying upon calculations, asserts that he has most frequently observed in women who brought forth only girls, and that none of the numerous signs, established *a priori* upon false notions, have ever been confirmed by the careful observation of facts. All that can be said in this regard is that certain women, when they are pregnant with a boy, feel certain symptoms, so distinct from those they experience when carrying a female, that they can scarcely be deceived; but then the signs attributed to pregnancy with the male sex sometimes announce the presence of a female fœtus, and *vice versâ*; most frequently there is a blending of the phenomena proper to the two opposite sexes, which always return with the same character for the same sex; so that these peculiarities, entirely individual, only applicable to a few subjects, and, moreover, pretty rare, can be of no use except to those women alone who are affected with them.

The old women say that if the first conception takes place during the waxing of the moon it will produce a boy, but if in the wane the woman will, on the contrary, be delivered of a girl; others equally skillful admit that the child will be of the same sex with the last one the mother bore, provided the moon did not change within three days after that confinement; finally, some accoucheurs, freely trusting to chance, ascertain first what the family or the lady most desires, and very good-naturedly promise what is wanted. It is best in my opinion to pursue just the contrary course; if a girl is wanted, promise a boy, and *vice versâ*. The reason of this is that, if you are deceived, the woman, happy to have the sex she longed for, readily forgives your mistake, and is satisfied to laugh at your pretended skill. If it turns out as you promised, on the other hand, the parents are compelled, in spite of their disappointment, to proclaim your cleverness.

SECT. II.—IS IT POSSIBLE TO PROCREATE EITHER SEX AT PLEASURE?

The desire of knowing beforehand the sex of the fœtus has given rise to one of the most piquant questions in physiology. It has been asked, whether man can, by means of known influences, determine the production of one sex rather than the other; and this point in the science, which was discussed in the time of Hippocrates, still engages the attention of several naturalists.

Relying, we scarcely know on what, unless it be upon the grand idea that the stronger side belongs to the stronger being, the father of medicine teaches that both in animals and in the human species the right testicle and the right ovary produce male germs, while female germs come from the left; *Fœtus mares dextra uteri parte*. Fournier, and also De Saint-Germain, say that "males generally are conceived on the right side, and females on the left." This opinion of the ancients, without having ever been generally adopted, without having ever been fortified by a single direct experiment, has, nevertheless, passed down for ages, and claims even in our day some partisans, even among learned physicians. However, admitting the fact, one great difficulty would still remain to be got over in applying it. How shall the seminal matter of the right gland, rather than that of the left, get into the womb, and *vice versâ*? In quadrupeds, indeed, it would be possible to take away from one the right and from another the left prolific gland; but what man would submit to such a mutilation for the sake of being able to procreate a boy rather than a girl? No one at the present time

would even venture to tie the spermatic cord on one side during coition, as Dionis insists was done in his day. Another expedient was evidently necessary; and Millot has gravely advised the couple to lie, during a fruitful copulation, on the side where the germ of the sex they desire to have is found. We might, to a certain extent, excuse the ancients, who believed that the human uterus was two-horned like that of brutes, for entertaining such an opinion; for believing that the semen of the right ovary would perhaps stop in the right horn, provided the two individuals took the precaution of lying on the corresponding side during the coition: but in the nineteenth century such conjectures are merely subjects for ridicule, and scarcely deserve the trouble of refutation.

Moreover, it is actually demonstrated that the basis of this hypothesis is entirely false. Legallois caused rabbits, from which he had removed one ovary, to be covered, and found that it did not prevent them from engendering young of different sexes. As regards the human species, the cases of men who, having lost one of the genital glands, have, notwithstanding, procreated both boys and girls, are too numerous to admit of a doubt. Mauriceau states a case of the kind at Rome, and cites also the case of a gunsmith of Paris. I might relate two cases of the same kind, and most surgeons must possess similar cases. I will relate two facts that are decisive on this subject. A woman died some years ago at the Maternité at Paris; she was the mother of ten or twelve children of both sexes; nevertheless, her sexual organs were so disposed that there were only one ovary and one tube attached to the corner of a womb, which was itself reduced to one of its halves. In the case by MM. Jouvét and Garnier, communicated to the Academy by M. Ollivier (d'Angers), it appears that the woman had been confined five times; that she had had four boys and one girl; that the first four pregnancies seemed to have been effected in the left uterine sinus, and the fifth and last only in that on the right side. Lastly, all naturalists know that, in animals, where the uterus is completely bi-lobated, the same horn is often filled at the same time with both male and female fœtuses. Consequently, the remarks of Millot, who defied the proof of a woman deprived of one of her ovaries becoming impregnated with either sex, would be at the present time valueless.

While doing justice to these suppositions, physiologists have, notwithstanding, retained a hope of one day ascertaining the conditions which cause one sex to be born rather than the other. M. Bory de Saint-Vincent has already emitted the bold opinion, that certain organic particles are susceptible of passing with nearly the same facility into the vegetable or animal state. Mr. Edwards thinks he has observed that the molecules of several confervæ, and other beings of doubtful nature, may be at will transformed into individuals of either organic kingdom. Finally, there were communicated, in 1825, to the *Société Philomathique*, certain researches which would tend to induce the belief that, by modifying in a certain way the influences under which the fecundation and entire reproduction of insects are effected, it is possible to occasion the production either of males or females at pleasure.

The ancient agriculturists were convinced, and country people still think, that if the north wind prevails, that if the season be dry and cool rather than warm and moist, when goats, sheep, and cows are admitted to the males, there will be fewer females produced than under the influence of a contrary state of the atmosphere. They are persuaded, moreover, that, in order to obtain a larger proportion of males, there is no better plan than to cause the females to be covered by the most vigorous animal of the kind. They therefore take care to choose the most active, the strongest, the youngest, and most robust buck, or ram, or bull, or stallion, they can find.

Besides, these traditions have been lately subjected to the test of experiment, and fully confirmed by the interesting researches of M. Girou. Numerous observations have been made, by this philanthropic cultivator, on horses, cows,

sheep, birds, &c., for several successive years, and, according to all appearance, with the greatest care. Now, they go to show that the stronger the male at the period of fecundation, the greater is the chance of obtaining males. For instance, in a flock of sheep, those that are first covered produce fewer males than those that come immediately after them, and these many more than the last moiety; for the ram does not appear to enjoy his whole prolific energy until after a certain number of copulations, and afterwards he becomes exhausted, gradually losing his strength.

Without mentioning the fable, which, according to Aristotle, says that, of seventy-two children, Hercules had but one daughter, other reasons still may be cited in support of those above mentioned; pigeons, doves, partridges, and many other birds that unite in couples, during each season of their loves, produce nearly the same number of males as of females. The gallinacæ, the common fowl, on the contrary, and geese, ducks, turkeys, &c., where the same male suffices for several females, furnish many more females than males of their respective species; while bitches, cats, and she-wolves, which ordinarily permit the approaches of several dogs, &c., engender more males than females. In fine, it is supposed that where polygamy is allowed in the human species, as in Persia and Turkey, there are more girls than boys born; and that in Europe, where the custom is not tolerated, the contrary is generally found to be the case, or at least that the proportions of the two sexes are about equal. In France, for instance, M. Poisson has established that the girls are to boys as fifteen to sixteen.

Consequently, it becomes probable that the nature of the sex is determined by that one of the couple whose prolific power, whether absolute or relative, is greatest at the moment of conception. It is true that numerous researches are yet necessary to transform this proposition into a mathematical truth; but, if it should ever be confirmed by authentic and careful observation, it is evident that the act of procreating the sexes at will, will no longer be a chimera, and that we ought not to give up the hope of being able to predict to pregnant women that they shall be delivered of a boy rather than of a girl. But it is doubtful whether, by adopting the course and language of M. Mayer, we shall ever attain to anything satisfactory on this interesting point of physiology. I cannot see, however, how Hoffacker has been able to say that sex depends on the age of the husband.

SECT. III.—OF THE INFLUENCE OF THE SEASONS AND OF PUBLIC PROSPERITY.

An important inquiry, and which flows naturally from the preceding, would be to know, whether in poor countries or in years of scarcity, and in provinces where the inhabitants are naturally weakly, idle, and wretched, the female sex exceeds the male in number. In order to resolve it, it would be necessary to consult the records of the civil state of people in the most opposite conditions. This work, which several moderns are on the point of undertaking, has by M. Bailly been already performed for the city of Celles, from which it appears that the proportion of girls is decidedly larger than that of boys in that barren and poor canton. However, M. Villermé, who devotes himself with such praise-worthy ardor to this branch of statistics, and who has made his observations on a much larger scale, has not come to the same conclusions; he has found that, in Sologne and other very poor departments, there is born as large a proportion of males as in the most opulent and agreeably situated cities; that the miserable peasants of Scotland, reduced to the necessity of living on potatoes and beans, procreate as many male children as the rich inhabitants of the environs of London.

After all, though it be right to state that prosperity or misery exerts no marked

influence on the proportion of the sexes, there is no reason why we should be surprised at it; for men and women are placed in the same circumstances. That merely proves that absolute force is not in this case one of the essential conditions, but it does not in any respect diminish the important bearing of the relative force of the couple.

There is no one who has failed to remark that births are more numerous at certain times and in certain countries, and more rare in others; but no attempt has been made to explain these apparent anomalies, nor to prove that they are in some degree fixed in their recurrences. M. Villermé has taken upon himself this double care: in a memoir read to the Academy of Sciences, he says that, out of a total of 7,651,437 births, reduced (*ramenées*) to 12,000, 1093 took place in January, 1186 in February, 1117 in March, 1057 in April, 1000 in November, 981 in December, 981 in September, 964 in October, 965 in May, 927 in August, 896 in June, and 884 in July, and that, consequently, the relative frequency of conceptions is far from being the same at all seasons of the year.

M. Villermé, always relying on calculations, in the same way passes successively in review the influence of holidays and public rejoicings, the first period of marriage, fasts and privations, temperature, latitude, vegetable or animal regimen, prosperity, civilization, liberty, the poverty and the calamities of the population, on the number of fecundations, and demonstrates that many more children are born under a fine climate, in countries where the arts, industry, commerce, and the sciences flourish, where the air is salubrious and the earth fertile, than in the contrary conditions; that famine and years of scarcity especially occasion extraordinary changes in the rate of population, &c.

In regard to the faculty of procreating at will children that shall be beautiful, endowed with great genius, and without bad passions, I can only refer the reader to the *Callipédie* of Cl. Quillet, to the *Mégalanthropogénésie* of M. Robert, or, lastly, to the *Traité de la philopédie*.

BOOK IV.

OF THE HUMAN OVUM.

THE human ovum, like that of other mammiferæ, is composed of the fœtus and its appendages. Having treated at length of the different questions belonging to it in another work, I think it necessary to dwell very little on it here.

PART I.

APPENDAGES.

THE appendages of the fœtus consist of the membranes, the placenta, and cord of the umbilical vesicle and allantois, and of the liquor amnii.

As they offer certain differences in simple, multiple, and extra-uterine pregnancies, it will be well to study them successively under these different conditions.

CHAPTER I.

SIMPLE PREGNANCY.

SECT. I.—OF THE MEMBRANES.

THE covering of the ovum is formed of three concentric layers, the caduca, the chorion, and the amnion. The first is furnished by the sexual organs of the mother, the two last belong to the ovum or the fœtus.

ART. I.—OF THE CADUCA, OR ANHISTOUS MEMBRANE.

The caducous membrane is so evident at all periods of gestation that it must have been noticed by every anatomist who has paid much attention to the examination of the human secundines. But these obscure descriptions only serve to hinder the researches of observers, and can in no respect be compared with that given of it by W. Hunter.

§ 1. FORMATION.

Impregnation determines in the uterus a specific irritation, which is promptly followed by an exudation of coagulable matter which concretes and soon trans-

forms itself into a kind of sac filled with a transparent and slightly rosy fluid. In contact with the whole extent of the parietes of the uterine cavity, this kind of bladder or membrane continues in some instances within the origin of the Fallopian tubes, and always into the upper part of the cervix, in the shape of solid concrete cords. The openings which Hunter, Denman, and Blumenbach observed at the entrance to the tubes and neck do not exist in the normal state. There is no reason to believe, with Millot, that this membrane is formed from the seminal fluid.

The ovule, after having passed through the tube, necessarily depresses the caducous membrane, so that it may glide on betwixt it and the uterus, to the internal surface of which it at last attaches itself; from this moment the pre-existing membrane is composed of two portions: one, very large, lining the whole interior of the womb, except the part which is in contact with the germ, bears the name of *uterine* or *external caduca*; the other, very small, depressed by the lower half of the fecundated vesicle, which it envelops, constitutes the *reflected caduca*, *internal caduca* or *epichorion*. The extent of the former augments in the same ratio with that of the womb, and the aggrandizement of the latter necessarily follows the growth of the germ. Therefore the cavity which separates them, and which is nothing more than the altered cavity of the primitive sac, is the greater, the nearer we are to the first periods of gestation.

§ 2. DISPOSITION.

The uterine caduca preserves a pretty considerable thickness, especially in the vicinity of the placenta, until the close of pregnancy; the epichorion, on the contrary, grows insensibly thinner, so that at the period of labor it is sometimes of an extreme tenuity.

One, by sinking down into the other, at length comes to be in contact with it, a little sooner or later, about the fourth month, for example; after this, the two layers remain in a state of more or less perfect contiguity until the expulsion of the after-birth, without, however, being even confounded together, notwithstanding the assertions of Hunter, and all others who have treated of this subject since his day. It is evident, then, that this membrane has the same relation to the ovule as the pleura has to the lung, or as the serous membrane of the pericardium to the heart,

The *external surface* of the caduca is uneven and porous, in contact with the interior of the womb, and invests the chorion as far as to the circumference of the placenta, but is not prolonged over the spongy surface of that body: to the former its adherence is very slight, and is effected only by means of mucous filaments, very easy to break, and which certainly are neither vessels nor nerves; to the latter the union is much more intimate, and so much the more so as the development of the ovum is more advanced. During the first two months, indeed, it is pretty easy to extract the ovule from that portion of the sac which constitutes its epichorion; while at a later period, the numerous filaments that habitually invest the germ contract such solid adhesions with the reflected caduca that it becomes more and more difficult to effect this separation without rupture.

The *internal surface*, being moistened by a fluid, although tuberculated, is nevertheless smooth, and lined with an extremely delicate pellicle. After the fluid has disappeared, and the reflected portion has come to be in contact with the uterine layer, this surface soon assumes the characters of the former. The *liquid* which fills the cavity of the caduca, and keeps its two surfaces apart, is sometimes quite limpid, but most commonly reddish, viscid, similar to melted glass, or rather to white of eggs.

If Granville had had a single opportunity of seeing a complete caduca during the first month of pregnancy, he could not have denied the existence of the *decidua reflexa*, nor would he have ridiculed those who compare this mem-

brane to a sac which the ovum pushes before it, when it passes into the uterus. The results of the labors of this author prove, besides, that he has only seen altered products; that his occupations have not allowed him to study thoroughly most of those authors of whom he speaks; and that he has observed very superficially the facts which he explains. It is the same with M. Carus, who says that the caduca should be considered as a flocculent layer of the chorion; and with Dr. Dewees, who accords to it a single lamina.

At the place where the caduca turns back so as to invest the ovum, it forms a circle which at first exhibits the form of a fold more or less regularly rounded, but which afterwards is gradually transformed into a thin and sharp edge, and ends at last by being more or less evidently continuous with the circumference of the placenta.

§ 3. STRUCTURE.

All of those who have treated of the caducous membrane with any detail pretend that they have met with vessels, even in great numbers, and consequently consider it organized. I believe, on the contrary, that it has none of the characters of true tissue at any period of pregnancy. It is so easy to prove that it is inorganic, by examining it on a fresh placenta, that I can scarcely comprehend how this remark has escaped observers.

It is true that it is sometimes sprinkled with reddish, stellated points, or bloody striæ, which might, under certain circumstances, induce a belief of the existence of vessels in its substance. If M. Lesauvage, who thinks himself still obliged to sustain the old doctrine, is so completely mistaken as to the real character of the caduca, after modifying it by many gratuitous suppositions, it is because the specimen which he examined, as he is himself convinced, was evidently in a pathological condition. In writing to the Academy of Sciences that the caduca is not developed until the ovum has reached the entrance of the womb, and that that which appears like a sac is only a morbid production, M. Coste has proved that this membrane has not been sufficiently studied by him in the human subject.

Extra-uterine pregnancies, the presence of certain polypi, some diseases of the ovaries or tubes, cause sometimes on the inner surface of the uterus a swelling, a vegetation, a softening which is easily shown, and which may be often mistaken for a true caduca. It is then that we can see an organized caduca, vascular, soft, and adherent, with holes in it opposite the tubes and neck of the uterus. The uterine cavity was in this condition in M. Dupin's specimen. But this condition has no relation to the normal caduca. We may also see, especially on its inner surface, an extremely delicate pellicle, which might frequently be mistaken for a cellular coat. Lastly, it also seems to be pretty frequently formed of fibres placed side by side, or even interlaced in various directions; but these spots and striæ of blood no more indicate the presence of vessels here than when they are met with on those membraniform concretions that are thrown off by children in croup.

If, then, the caducous membrane is not an organic membrane, if it is merely an *adventitious* coat, as M. Blainville calls it, or the result of a concretion taking place in the uterus, the name of *anhistous* membrane, which I propose to bestow upon it, and which is synonymous with inorganic membrane, appears to me to be the only one that can be advantageously applied to it.

I have submitted to the scrutiny of MM. de Blainville, Magendie, Serres, Flourens, and many other savans, an ovum of about one month, in which all that I have just said, and which has been in the most part stated by M. Moreau, of the caduca, is most clearly demonstrated. The specimen which I presented to the Academy of Sciences, at its sitting of the 26th of August, 1833, was given to me by M. le Docteur Mavré. I used it, in November, to show my pupils the

perfect exactitude of Figs. 2 and 3, Plate VIII., and of Figs. 1, 2, and 3, Plate X., of my *Ovology*. If Dr. Burns had seen it, he would not contend hereafter, as he still does, that, of the two layers of the *caduca*, one is vascular and very adherent, and that the other is gelatinous. No other English writer can establish the fact that the *caduca* exists at first between the ovum and the womb, but that the development of the placenta is completed by its partial disappearance from a certain extent of surface. Wagner, who, in a long memoir on the *caduca*, arrives at the same conclusions with myself, gives, as does also Bojanus, the name of *secondary caduca* to the layer observed by M. Moreau and myself at the surface of the placenta, and claims to have established the existence of a gelatinous plug in the neck of the womb.

§ 4. USES.

I shall not stop to combat the opinion of those who think that the *anhistous* membrane serves to nourish the fœtus during the first weeks of its existence. To remark that the umbilical cord is always inserted on that portion of the ovule which is not covered with this concretion, ought to be sufficient to demonstrate that it is unconnected with the nutrition of the first lineaments of the fœtus.

Its use is to sustain the vesicle on some one point of the uterine cavity. I know it may be objected that it fixes and maintains itself as firmly in animals as in women, and just as well in extra-uterine as in natural pregnancy; but in brutes, the surface of the ovule, and the form of the parts through which it has to pass, are far from being in all respects similar to those that are noticed in the human species. The uterine horns in brutes differ from the human uterus in this respect, that they never dilate enough to permit the germ that passes through or stops in them to be in contact with all the points of the circle to which it corresponds, in one of those organic tubes. Further, when the product of fecundation accidentally develops itself in the peritoneum, or the tube, or even in the substance of the uterus, it remains uniformly contiguous to the walls of the cavity which it has appropriated; so that the *caduca*, such as I understand it, is not at all necessary in these two circumstances, and its absence, therefore, does not at all prove that, in relation to ordinary gestation, it has not the uses I have just assigned to it. If it exists in such cases, it has not the same characters which it presents in the uterus. In the specimen of M. Dufré, which I saw at La Pitié, and which I observed with much care, the *caduca* presented but one lamina, which was, besides being irregular, placed here and there over the surface of the ovum.

Another use of the *anhistous* membrane seems to me to be to circumscribe the placenta, and determine the place of its insertion; but I defer the examination of this point to another article.

ART. II.—THE CHORION.

To prevent, for the future, the chorion from being confounded with any other membrane, it will suffice to remember what I have just said concerning the *caducous* membrane, and that it constitutes the first organized or solid tunic of the ovum as we pass from the womb to the fœtus, and the second in proceeding from the fœtus to the womb.

§ 1. PRIMITIVE CONDITION.

In a production of ten or twelve days' standing, the chorion presents the appearance of a velvet-like hydatid, or a small transparent vesicle; its external surface, free from all adhesions, is somewhat fungous or fretted throughout its whole extent: its interior is filled with a clear serous fluid, which M. Carus improperly supposes to belong to the umbilical vesicle.

§ 2. GRANULATIONS AND VILLOSITIES.

It is generally thought that the down that covers the chorion is of a vascular nature; but as early as 1823, I ventured to oppose this hypothesis. What proves that the filaments of the chorion are not vessels is this, that they are to be seen before blood-vessels of the cord are recognizable. Besides, until the sixth week, every flock is at least as large as one of the umbilical vessels; so that, as there are only three of these, it is difficult for them to give birth to the others, which amount to several dozens. Further, these villousities, all independent of each other, are regularly spread over the whole periphery of the ovule, while the cord and placenta are only connected with one point of this vesicle; and notwithstanding the efforts of an infinitude of very able anatomists, nobody has proved that they are hollow rather than concrete, vascular rather than solid cellular filaments; lastly, when examined with a lens, they are found to form certain areolar spongioles, and not permeable conduits.

The *abnormal* continuance, or preternatural growth of the swellings above mentioned has led me to suppose that such hydatids as are found in bunches in the womb are not vesicular worms, as is commonly supposed, but rather the product of an aborted ovum, whose small gangliform bodies have taken on an unnatural growth.

§ 3. THICKNESS.

I have studied the chorion, whether at term or other periods of pregnancy, in a great number of specimens, and have always found, in my dissections, that it is everywhere transparent and thin, as well upon the placenta as elsewhere.

Hewson, and many who preceded him, have asserted that the chorion is formed of several coats, which, being early applied to each other, come at last to constitute only a single one; that the placenta results from the unfolding and thickening of these laminæ, from which each of the umbilical vessels receives a sheath, &c. But I have already shown, in 1824, that the reason of this supposition probably depends upon the presence of a concrete lamellar layer, which indeed does invest the vascular roots of the placenta, and separates it from the external surface of the chorion. At present, I may add that, if Ruysch, Haller, and so many others, supposed the chorion to be constituted of a variable number of layers, it was because they had never separated it from the membrana caduca. If M. Dutrochet and M. Burdach give to it two laminæ, it depends on the interpretation given by each of them to the disposition of the foetal coverings. As to the assertions of M. Granville, who maintains that the chorion not only consists of two layers, but even of three, and that its internal surface is as villous as the external, it is explained by the confusion which seems to exist in the mind of this author, regarding all that concerns the human ovum. This is the membrane of the human ovum which M. Carus seems to have understood best, although he has improperly compared it to the shell of the bird's egg. If M. Chevreul has accorded to it a layer, passing over the uterine surface of the placenta, it is because he appears, as did the older writers, not to have understood the caduca.

At a fortnight, and at three weeks, as well as at two months, the chorion in the human subject is simple, and although, at a later period, other laminæ become connected with it, they belong to bodies not as yet described, and which cannot, under any pretext, be considered as its appendages.

§ 4. TEXTURE.

The chorion can be referred neither to the derm, the muscles, the aponeuroses, nor peritoneum; however, it is difficult to call in question its cellular nature, or to deny its analogy with the serous membranes, of which, besides, it presents all

the characters, whether physical or physiological. Does it contain nerves and lymphatic, sanguineous, exhalant and inhalant vessels?

The lymphatics which Schroeger and many others think that they have met with in the chorion seem to me to have been only observed by M. Fohman, who met with them everywhere. As to nerves, I think I may say that they are no more to be found there than the exhalants and lymphatics.

The question in relation to *blood-vessels* deserves much more attention. Blumenbach has already decided their existence.

In attempting to separate the reflected anhistous coat from the exterior surface of the chorion, we soon perceive an indefinite number of filaments passing from each one of these laminæ to the other, and which are more numerous as we approach the circumference of the placenta, or are nearer to the commencement of the pregnancy. But these filaments, which Sandifort and others mistook for vessels, are nothing but the remains of the villous *tomentum* of the ovule, and not canals carrying on any circulation whatever. The chorion exists before the embryo; with the exception of the portion that is to support the placenta, it is completely separated from the womb by an inert stratum; the umbilical and placental vessels do not make their appearance in the new being until the ovule attaches itself to the internal surface of the uterus; it is only, therefore, in the area circumscribed by the reflection of the anhistous membrane that the villi of the chorion can allow any vessels to be developed.

§ 5. ANALOGY.

The chorion is met with in all the vertebral animals; but with such modifications that most physiologists have been unable as yet to agree concerning its nature: in the batrachian reptiles, as in women, it forms the covering of the ovule; in the saurians, it exhibits a much greater thickness and solidity, although it has the same relations with the organs of the female. In the ophidians, it composes that membrane which is so dense and difficult to break, and which constitutes the shell or outer covering. In birds, the chorion is much farther removed from the vitellus, and in fact is not formed until after several other laminæ. This is the membrane that lines the inner surface of the calcareous shell, and which is known as the membrane of the shell. Finally, in the mammiferæ, as well as in the human species, it supports the placenta or the cotyledons, and throughout the remainder of its extent is separated from the womb or its horns only by an inorganic layer of variable consistence and thickness.

ART. III.—THE AMNIOS.

The amnios, also designated by the terms *amiculum*, *agnelette*, *aurelia*, *charta virginea*, &c., is the inner membrane of the human ovum; smooth, transparent, separated from the fœtus by the fluid which bears the same name, it slightly adheres to the chorion by means of the mucous filaments or lamellæ which cover its outer surface.

During the first fortnight of gestation, the amnios has no immediate connection with the fetal end of the umbilical cord, on which, at a somewhat later period, it doubles, so as to furnish it with a sheath, and place itself in contact with the inner surface of the chorion. That this disposition is maintained, saving in a few exceptions, until the abdominal parietes are completely formed; that until then there is no continuity between the amniotic membrane and the epidermis but, in fine, this continuity established by the ancients, and at the present time by M. Mondini, who also thought that the chorion is continuous with the aponeurosis, it is difficult to deny.

It also follows that the amnios is far from touching the internal surface of the chorion at all periods of pregnancy, as is generally supposed, but that these two

membranes are, on the contrary, separated from each other by a considerable space, during a period which differs in different individuals, as Saint-Hilaire, Blumenbach, and Hamilton have long since remarked.

This *space*, which is at first very large in proportion to the cavity of the chorion, much larger than the amnios itself during the whole of the first month, afterwards diminishes by degrees, in proportion to the increase of the amnios, so that at two months it about equals that which separates the embryo from its envelop; at length the disproportional growth of this last-named membrane causes it to disappear almost entirely, so that towards the fourth or fifth month we are obliged to suspect, in order to be able to recognize its existence.

It is useless to repeat what I have said as to the non-existence of vessels in the proper tissue of the chorion, for the purpose of showing that they are far more certainly wanting in the amnios: indeed, nothing leads us to admit of their existence in the latter; it is never covered with villi like the former; it never has any intimate connection with any vascular organ, and all that has been said upon the subject by various authors, in fact, consists of mere assertions, or rather of pure suppositions. It was reserved to M. Granville to show that it is a secretory membrane, and to ascribe to it a rich vascular apparatus. When M. Carus says that he has found the amnios beneath the chorion, having the appearance of the arachnoid, he certainly allows himself to be imposed upon by some other lamella.

ART. IV.—WATER OF THE AMNIOS.

Besides the fœtus and the cord, the amnios contains a fluid called the *water of the amnios*, or amniotic liquor.

At the beginning, these waters form but a thin stratum; their proportional quantity afterwards increases rapidly until towards the end of the second month, when the inner membrane of the ovum comes in contact with the chorion: at three months the weight of the amniotic fluid considerably exceeds that of the fœtus; but at term the weight of the fœtus, in turn, considerably exceeds that of the fluid in which it floats. At birth, in fact, there are commonly not more than from ten to thirty ounces of fluid. However, it would not be correct to say, with Madame Boivin and several others, that the quantity of fluid diminishes in an absolute manner from the middle of pregnancy until the moment of parturition. It is, on the contrary, certain that it augments until the close, but in less proportion than at the commencement of gestation.

But in this respect very great differences are observed. Instead of one pound, there may be two, four, and even ten pounds, or only a few ounces. Its abundance is generally in an inverse ratio to the vigor, size, and strength of the fœtus, and robust constitution of the woman. So that a fœtus weighing five pounds, for example, will float in two, three, or four pounds of the water, while only one pound will be found about a child of eight or nine pounds weight.

According to some authors, its nauseous, insipid smell somewhat resembles that of semen. On the whole, it is nearly similar to that exhaled from the belly of a slaughtered animal. Unctuous, possessing rather more consistence than pure water, the liquor amnii is clear, like simple serum, or of a slightly citron or greenish color, ordinarily transparent. It is not unfrequently lactescent, thick, mixed with albuminous flocks of a gray, yellow, or blackish color. Its taste is both sweetish and slightly saltish. In some cases, it is so acrid and astringent as to pucker the skin of the accoucheur's fingers, when he keeps them beyond a few seconds in the vagina or womb.

It does not appear to contain more animal matter in the first than in the last half of pregnancy. Its chemical composition is very complicated, and, besides, has only been studied in animals. MM. Vauquelin and Buniva found it to contain: water 98.8; albumen, salts of soda, and lime, 1.2. M. Berzelius

says that it contains fluoric acid; Scheele says he found free oxygen in it; M. Geoffroy Saint-Hilaire admits that it contains atmospheric air in a state of mixture: but MM. Lassaigne and Chevreul, at a later period, discovered that what one of them had mistaken for air was nothing but a gas composed of carbonic acid and azote.

Trusting to certain experiments of Monro, who, by injecting warm water into the uterine vessels, found it to transude upon the inner surface of the amnios; to Haller's assertion that the waters become impregnated with the odor, color, and even nature of medicinal substances taken by the woman; to the existence of supposed vessels between the womb and envelop of the ovum, most physiologists have admitted that the liquor amnii is directly furnished by the mother. Others, however, have maintained the contrary, and believe with Scheele, Winslow, Van-den-Bosch, and M. Lobstein, that it comes chiefly from the fœtus, particularly from the placental vessels; Chanssier, Bérard, and Meckel seem to hold a mixed opinion, and endeavor to reconcile both the above hypotheses.

Those who refer the liquor amnii to the fœtus have placed its source in the sweat, the insensible transpiration, or the urinary secretion, or in the glands or particular bodies of the placenta, or in the vessels which Needham, Fabricius, Ruysch, and Haller say they observed betwixt the lamellæ of the amnios; some of the ancients made of it a *colliquamentum* coming from the semen, &c. Such as attribute it to the mother merely say that it is poured out by exhalation in the interior of the ovum.

I do not think it would be useful to refute these opinions one by one; I shall content myself with remarking that there is no vascular connection betwixt the womb and the membranes, that the spongy coat is separated from that organ by an inorganic layer, the membrana caduca, and that for more than a month the amnios does not even touch the inner face of the chorion, to show that the fluid in question is not derived immediately from the uterus; the proportional quantity of the liquid, being much greater in the first period of pregnancy, ought also to suffice to show that it cannot be supposed to come directly from the fœtus.

Everything proves that the water of the amnios is the product of a transudation, or of a simple exhalation, like the serosity of the pleura, the pericardium, the peritoneum or arachnoid, and like the synovial fluid of the tendinous sheaths, or of the articulations; that this perspiration does not require for its production the existence of special canals; and that it is an instance of mere vital imbibition. The viscid matters, the muddy appearance, the yellow or greenish flocks frequently met with in it, do not in any respect belong to it; for they are nothing more than portions of meconium, or of the sebaceous matters separated from the fœtus, or even of the vitriform substance, and also of the vesicles which exist primarily between the membranes.

Its uses are, 1. To favor the active or passive motions of the fœtus, which, if it were without the liquor, would be everywhere pressed by the uterus, and could not develop itself. 2. To permit the isolation of the limbs and of their different parts; to prevent the fingers from remaining in contact and adhering together; to oppose the adhesion of the forearm, or of the legs and thighs to the breast and abdomen, as happened in a case related by M. Morlanne, where the fœtus was born with such adhesions, six weeks after the discharge of the waters. 3. To protect the child against the shocks and jars that might be experienced by the mother, and particularly by the womb; to protect the tender being from all kinds of compression, and to furnish it with a kind of tepid bath which might favor the circulation of its fluids, and afford to it a facility for moving according to the laws of gravitation, and to have the head always directed towards the neck of the uterus. 4. To keep the membranes always apart, maintain the dilatation of the womb, and keep up a gentle pressure upon the cord and surface of the

child. 5. In labor, to permit the formation of the bag of waters, a real segment of a sphere, which, by gradually engaging in the cervix, singularly promotes its dilatation. 6. After the rupture of the membranes, to lubricate the genital organs, to soften them, and thereby render the passage of the head easier and less painful. 7, and lastly. To render operations much more simple and free from danger, when compelled to introduce the hand into the womb.

SECT. II.—THE VESICLES.

ART. I.—THE UMBILICAL VESICLE.

The umbilical vesicle is an organ that was unknown to the ancients, of which much has been said by the moderns, either with a view to place its existence beyond doubt, or on the contrary to reject it as among anomalies or pathological changes, but which has not been described so exactly as to enable physiologists to get a clear idea of it. A learned German, M. Mayer, who gave a singular description of it in 1832, says that it exists even at full time, and that its duct does not become permeable until after the fourth week.

However, the numerous cases I have collected enable me to affirm that the human ovum is always provided with it until the eighth week of its growth. If numerous naturalists failed to meet with it, it is because they sought for it in specimens from which it had disappeared, either by the natural progress of pregnancy, or by the rupture of the membranes in the abortion, or in consequence of some morbid state, or the decomposition of the parts that enter into the texture of the ovum; or, lastly, because they were not sufficiently practiced in these sorts of researches always to detect it, though it really existed.

In a total of about two hundred specimens, examined before the end of the third month, I only met with the umbilical vesicle in a state that could be called natural, thirty times.

§ 1. DISPOSITION.

The umbilical vesicle is a small pyriform sac of a rounded or spheroidal shape, which, about the fifteenth or twentieth day after fecundation, is as *large* as a common pea; that is to say, from two to four lines in diameter. It probably acquires its greatest dimensions in the course of the third or fourth week; at least, I have always found it smaller beyond the first month. I confess, I never had an opportunity of examining but one before the first fortnight, and that was also smaller. Blumenbach, who says that it is smaller than a grain of mustard seed, and who could see it in an ovum of one month only by the use of the microscope, was evidently mistaken on the subject. When reduced to the size of a coriander seed, which commonly takes place about the fifth, sixth, or seventh week, it generally ceases to diminish, but becomes flattened, and then insensibly disappears; sometimes it can no longer be found at the third month, while in other cases it may be met with in abortions of four, five, or six months.

§ 2. SITUATION.

It is incontestably *situated* betwixt the chorion and amnios. If I maintained a contrary opinion in 1824, it is because I then confounded it with a vesicular body, which to a certain extent resembles it, but which in fact differs very widely from it, as I shall have occasion to show in the sequel. It is certain that M. Mondini, who says that he has injected it, and who places it between the chorion and placenta, has been deceived by some anomaly. I will say the same of M. Lauth, who believes it to be situated in the insertion of the *cord*.

Until the thirtieth or fortieth day, it is inclosed in the reticulated body or vitriform layer; after that it unites with, and applies itself either to the internal

surface of the chorion or to the outer surface of the amnios. It would seem then that one of these membranes encloses it betwixt its layers; indeed, it is most frequently met with thus, though I have found it perfectly free in ova of two and even three months.

§ 3. PEDICLE.

The characters of the *pedicle* by which it is attached to the embryo vary according to the stage of the pregnancy; until the end of the first month, and in the natural state, I have not found it less than two, nor more than six lines long; at this period of its development, it is often a quarter of a line thick, and in becoming confounded with the vesicle undergoes a sort of infundibuliform expansion. Towards the abdomen it does not enlarge, neither does it contract in any sensible degree. Its continuity with the intestinal tube can now no longer be called in question in the human subject. Before the parietes of the abdomen are completely formed, it is divided, as it were, into two portions by the amnios, which it appears to have traversed or perforated. One of these portions is found betwixt the spine and the spot to be subsequently occupied by the umbilicus; the other remains without, between the amnios and the vesicle.

After the first month, the canal elongates, becomes more and more delicate; its umbilical portion is lost in the cord, and can no more be traced as far as the belly; its length may extend to half an inch, an inch, or even one inch and a half. Whenever I have found the vesicle further than this from the root of the cord, it manifestly depended upon its pedicle having been broken by the tractions naturally exercised upon it by the membranes when these parts acquire an early and pretty strong adherence to each other. Accordingly, as this rupture is effected earlier or later, as the adhesions are stronger or weaker, as the pregnancy is more or less advanced, the vitelline sac is found to be more or less remote from the umbilical cord, or, if you please, more or less approximated to the circumference of the placenta.

This stem is unquestionably hollow until the twentieth or thirtieth day, for I was able in two specimens to squeeze the liquid from the vesicle into the intestine without rupturing anything. It becomes obliterated at a period which has not appeared to me to be always the same; in general, however, it may be said to be no longer permeable at five weeks, and its occlusion takes place from the navel towards the vesicle in proportion as the cord becomes more complete.

§ 4. PARIETES.

The *parietes* of the vitelline sac are strong, resisting, pretty thick, and difficult to lacerate; they have never appeared to me to be more frail than the other membranes of the ovum, unless they had been previously rendered thinner by some morbid change or by some mechanical cause. Smooth and even when the vesicle is full, they wrinkle or fold, on the contrary, when that little body is emptied; they are generally of a yellowish color, but, perhaps, this tint depends upon the fluids they contain.

§ 5. BLOOD-VESSELS.

Arterial and *venous* vessels are visibly distributed upon it. I have observed them not only in the substance of the parietes of the vitello-intestinal canal, but also in those of the vesicle itself; in the latter twice, and more than twenty times in the former. In the former case I saw them compose a very beautiful net-work with arborescent ramifications, extremely easy to follow, without any particular preparation, and even with the naked eye. In the latter, they consisted of two trunks becoming larger and larger as they approached towards the abdomen.

These vessels, denominated the *omphalo-mesenteric vessels*, would be better named *vitello-mesenteric*, or simply *vitelline*. According to my own observation,

they do not empty themselves into the superior mesenteric vein and artery; I have always remarked that they join one of the branches of the second or third order of these great vessels, particularly those that proceed to be distributed to the cæcum. I have often traced them in the abdomen, through the umbilical ring, and as far as one, two, and even three inches along the cord, in products of six weeks, and two or three months old. But they disappear at these different periods, and at last are lost in the spongy tissue of the umbilical cord, before arriving at the vesicle. I have several times succeeded in injecting them, and then they appeared of the size of a large hair; in general, however, they are so fine that they are easily broken if sought for without the greatest care.

M. Spangenberg pretends that they are still permeable in the adult, but it seems that this fact needs more confirmation than the author has given it.

Many reasons, drawn from analogy, have led to a comparison between the vitelline matter and the yelks or vitelline substance of the eggs of birds. In the largest umbilical vesicle I ever saw, and perhaps the only one where there was no possibility of this substance having undergone any change whatever, it was of a very decided pale yellow, consequently opaque, of the consistency of a pretty thick emulsion, and different in all respects from serum or any other known fluid of the economy. In others, I have found it more fluid and clearer, and in others yellower and thicker; in several specimens, it consisted of one or two small concrete clots, resembling, in a remarkable manner, the yolk of egg cooked and floating in a slightly colored fluid; to conclude, its color is analogous to that exhibited by the parietes of the vesicle itself, after the sixth week of its growth. We ought, consequently, to admit that it is a nutritious substance, a sort of oil, in a great degree similar to that which constitutes the vitelline fluid of the hen's egg.

§ 6. USES.

The uses of this apparatus then are evidently connected with the nutrition of the primary lineaments of the fœtus; it furnishes to the embryo its means of growth until the cord and umbilical vessels are formed, or rather until the ovule becomes exactly applied to the inner surface of the womb. Numerous materials then pass from the parts of the woman to those of the ovum, and the umbilical vesicle soon becomes useless. From the moment of fecundation until the ovule is found in immediate contact with the inner surface of the womb, the product of human conception is in almost all respects similar to the egg of a bird: like it, free, and independent of every part of the mother, it must contain whatever is necessary within itself; it must contain a substance, by the expenditure of which the growth of the embryo can be effected; just as the chick must enclose within its shell a material subservient to its evolution. But in one this arrangement is only transient, while in the other it remains until the embryo is hatched. M. Carus believes that it detaches itself from the ovary, and that it is immediately surrounded by the chorion. It should, according to this author, bear the name of *stomachal* or *intestinal* vesicle. Its use, as he says, is to form the digestive tube, after which it enters by degrees into the abdomen, but the description which I have given appears to me to suffice to refute the opinion of M. Carus.

ART. II.—THE ALLANTOIS.

The allantois has by turns been admitted and rejected in the human ovum, from the earliest history of anatomy until our own times, and even now most authors agree in rejecting its existence. All indeed who have described it speak of it merely from analogy, or have mistaken it for an organ with which it is important that it should not be confounded.

It is the chorion, for a long time confounded with the anhistous membrane,

which has been described in place of the allantois. This mistake was made by Hoboken, and I am surprised that Carus failed to notice the circumstance.

§ 1. RETICULATED BODY.

In an ovum of about twenty days old, the space between the amnios and chorion, which was quite considerable, as it should be in the first month of pregnancy, was almost entirely filled by a fungous substance of a brownish-yellow color, which was less thick the nearer it was observed to the umbilical cord, while it was several lines thick at the point diametrically opposite. Notwithstanding this great thickness, it was impossible for me to divide it into several laminæ; it appeared to be formed of an infinite number of filaments and lamellæ, disposed without regular order, but so as to form a sort of reticulated magma.

In another very fresh ovum, of three or four weeks, it existed just beneath the chorion, as a dull white layer, extremely fine, and almost as easily destroyed as the retina. It was full of an emulsive or cream-like substance of a slightly yellowish white, and which tended to escape in homogeneous grumes. Its inner surface gave birth to fibres and lamellæ, and to numberless prolongations which decussated in every direction, like what is observable in the spleen, the seminal gland, the corpora cavernosa, and as is said to be the case, also, in the hyaloid membrane of the eye. These filaments, after traversing the semi-fluid white matter, proceeded to a second lamella, which, without any intermedium, was in contact with the periphery of the amnios, of the umbilical vesicle, and of its pedicle. Certain isolated shreds, being washed and floated, exhibited an almost perfect transparency, and much less thickness than the amnios.

To sum up, this new organ constituted a sac with a double coat, moulded upon the cavity of the chorion, enclosing the umbilical vesicle and the amnios, after the manner of the serous membranes, forming interiorly a true net-work with large unequal meshes, in which the emulsive fluid was lodged. Its two coats, separated at one place by a distance of more than three lines, became more and more proximate towards the root of the umbilical cord; near the belly they appeared to be confounded with each other, but their extreme tenuity prevented me from ascertaining what organ of the abdomen they were continuous with.

§ 2. VITRIFORM MATTER.

From the fifth week after conception until the close of pregnancy, there is betwixt the chorion and amnios a transparent stratum, either colorless or of a somewhat greenish yellow; this stratum, instead of being merely serous, is lamellated after the manner of the vitreous body; it diminishes in thickness in proportion to the development of the other membranes; the quantity of fluid contained in its meshes is, on the contrary, in the inverse ratio of the progress of gestation; by diminishing in thickness, it at length comes to form only a homogeneous pulpy stratum, to transform itself into a simple gelatinous or mucous coating, which, in many women, wholly disappears before the period of delivery; several of its lamellæ are confounded together at the external surface of the amnios, principally in the environs of the root of the umbilical cord; the same thing takes place, but more rarely as to the chorion, which explains why the umbilical vesicle, observed after the sixth week of gestation, is very often united, as if framed in, with the membranes of the chorion and amnios; this matter occupies the place of the reticulated body, and like the latter is continuous with the gelatinous portion of the cord. But is it independent of the porous sac which precedes it? or, rather, is it only a modification thereof? This last conjecture seems to me to be, if not certainly true, at least extremely probable.

In mammiferæ I have observed, even at the close of gestation, that the urachus, after traversing the umbilical cord, expands into a smooth tissue, that is porous, and, as it were, drilled full of holes, which at last unites intimately with

the corresponding surfaces of the membranes between which it is naturally placed. In this cribriform membrane we meet at other periods with certain pelotons of concrete fatty matter, similar to the *hippomanes* of horses; and as the bladder opens into it, it unquestionably constitutes part of the allantois.

There are, therefore, between the sac, known as the *allantois* in the mammiferæ, birds, and reptiles, and the reticulated body which I discovered in the human ovum, the most striking agreement in respect to resemblance and nature.

§ 3. USES.

In maintaining that the allantois is designed to contain the urine of the fœtus, naturalists have in all ages relied chiefly upon its communication with the bladder in brutes, upon the saline taste of the fluid met with in it, and, according to Daubenton, on the urinary smell observed in it. I do not think that, even in the viviparous animals, these data are sufficient to establish such an opinion; the urinary odor is a character which is surely too fugacious for us to attach any great importance to it, and on this point is it quite sure that Daubenton was not mistaken? In the second place, what does the salt taste prove? Do we not meet with it in the water of the amnios? Was it not communicated by the last-named fluid to the former?

As to the human species, whether the reticulated body is analogous to the allantois, or constitutes a different organ—whether it communicates with the bladder by means of some channel, or is independent of it—it appears to me impossible to establish the least affinity between the substance found in it and the urinary fluid.

Its functions, like those of the umbilical vesicle, are, in my opinion, connected with the early nutrition of the germ. Perhaps it serves for the development of some particular organ, or some special apparatus; on this subject, we may indulge in a thousand conjectures; but, fearing to stray in the field of supposition, I prefer to wait for new facts. I shall content myself with showing that the inner surface of the flaps which I have turned back on it were covered with an adherent layer of a cream-like matter contained in its interior; that, in the microscope, it presented a villous appearance, and that from this double peculiarity it is probable that the substance in the reticulated body is secreted by its own parietes. This, moreover, would be an argument in favor of the opinion of Harvey, of Joerg, and of Oken, in relation to the fluid of the allantois in animals. I will observe, further, that this matter preserves its cream-like, flaky aspect, its appearances of an emulsive fluid, its characters of a nutritive substance, until the ovule is well fixed in the womb, and then disappears very rapidly, giving place to the albuminous stratum, which remains until the termination of pregnancy.

§ 4. ERYTHROID VESICLE.

I do not speak here of a third vesicle, described by M. Pockels, under the name of *vesicule erythroïde*, because I have not found it, and because I think with M. Carus, that the observer of Brunswick is himself mistaken as to what he has seen.

ART. III.—THE CORD AND PLACENTA.

§ 1. OF THE UMBILICAL CORD.

The umbilical cord is a stem by which the abdomen of the fœtus is connected with the membranes of the ovum, from the commencement until the end of pregnancy.

A. *Dimensions*.—Its *length*, although variable, is notwithstanding generally the same as, or a little greater or less than, that of the fœtus at birth, that is to say, from fifteen to twenty inches. Denman, Sandiford, Morlaine, MM. Maygrier and Schneider have spoken of cords from five to six feet in length. Hebenstreit

saw one forty inches long, Wrisberg one forty-eight inches, and M. Carus one of five feet five inches; others have been seen only a few inches long, which even allowed the placenta to touch the fœtus directly. In a case communicated to me by M. Levacher, it was so short that the placenta was obliged to follow the fœtus at once. Mauriceau cites one of six inches, Littre one of nine, Burton one of ten, and two others not much longer; Smëllie two of six or seven inches; Haighton one of seven; and Morlanne one of six. But these extremes of dimension are rare, and some of the notices of them require to be repeated.

Sometimes *thicker*, at others more *slender*, it generally is about the size of the little finger. In this respect its anomalies, which are much more apparent than real, depend upon whether the spongy tissue of which it is partly composed is engorged with fluids which constitute *fat cords*, or, on the other hand, almost entirely desiccated, and then the cord is *lean*. However, they may also depend upon varieties in the absolute thickness of their vessels or sheaths.

B. Knots.—Although smooth and polished like the serous membranes, the human cord, nevertheless, exhibits many *nodosities* of different kinds, on which I must dwell for a moment: on some occasions, they are real knots, either simple or complex; more frequently, however, they are doublings, vascular nooses, whether of the arteries or of the vein; the former are met with particularly where the cord is very long, are owing to the movements of the fœtus, are effected in the same way as the twisting of the cord about the neck, limbs, or other parts of the child, frequently met with in parturition, and it may be said are but the definite result of this last-mentioned disposition. Generally they give rise to no trouble in the circulation. M. Rogers says that three of these knots in the cord will not prevent an injection from penetrating into the placenta; nevertheless, the knot was so firm in two cases observed by Van Swieten, in the same woman, that the vessels were obliterated and the fœtus was dead. Smëllie also attributes the death of a child to the same cause.

The second, known in all ages, are, according to Harvey, more frequently formed by the vein than by the arteries; but, according to my own researches and those of Hoboken, more frequently by the arteries than by the vein. Being produced by the folding of one or both these vessels, after the manner of the varicose knots in other parts of the body, there may be only one or several of them on the same cord. Rhodion and Avicenna among the ancients, and the old women of all periods, pretend that by means of the number of these knots, their remoteness from or nearness to each other, and their color, it is possible to ascertain the number and sex of the children the woman is to have in future, the interval between each of the confinements, &c. These ridiculous pretensions, begotten by the superstition of our ancestors, doubtless do not deserve to be seriously opposed; but they are so often met with among the public, that I thought they ought not to be passed over in silence. Although they have never been accused of interfering with the omphalo-placental circulation, it may nevertheless be concluded that, if very numerous and close, and presenting very acute angles, these turnings might be the means of obstructing, to a greater or less degree, the flow of the blood in its proper vessels.

C. Point of insertion.—The point of the belly which gives insertion to the umbilical cord is at a greater distance from the breast, or nearer the pubis, in proportion as the pregnancy is less advanced. At birth, it generally corresponds, according to Chaussier and M. Bigeschi, to the middle of the space between the vertex and soles of the feet. It ordinarily terminates in the centre of the placenta; but it is also sometimes found attached very near the circumference of that body. In the former case, the branches of which it is composed diverge by expanding in the covering of the ovum; in the latter, it is not a rare occurrence to find it creeping betwixt the membranes a longer or shorter time before it is lost in the placental parenchyma. Of an equal size throughout its whole extent in some

subjects, it is in others much more slender near its root than near the abdomen, and reciprocally.

D. *Development*.—Trusting to false analogies, hypothetical data, or careless observations, authors have asserted that it does not begin to be distinct until after the first month of gestation. The youngest embryos I have ever dissected had the umbilical cord. I am now in possession of several of from one fortnight to three weeks old, which are only three or four lines long, and in which the cord is equal to, or even exceeds the length of the fœtus. Relying upon very numerous facts, I think I can establish it as a general rule that the length of the cord is about equal to, or somewhat exceeding that of the fœtus, at all periods of pregnancy.

E. *Swellings*.—It is slender and cylindrical until the end of the third week; a little later, from the fourth to the seventh, the eighth, or even the ninth week, it acquires a considerable relative size, exhibits tubercles, vesicles, or swellings, which I have nowhere seen described, which are to the number of two, three, or four, and separated by the same number of contractions. In the course of the third, it becomes smaller, in consequence of the shrinking away of its swellings; finally, from this period until the termination of pregnancy, it ceases to grow in proportion to the other parts of the fœtus.

F. *Its composition* is far from being the same at all stages of its evolution. At the commencement, it really consists only of a small solid cylinder, to which the amnios does not furnish any coat. From the fifth week it contains the duct of the umbilical vesicle, and a portion of the urachus or allantois, and some of the intestines. But about the second month, the alimentary canal has re-entered the abdomen, the urachus, the vitelline duct, and its vessels have become obliterated, so that at three months, as at nine, the umbilical stem is formed only of two arteries, the vein of the same name, of the gelatin of Warthon, or spongy tissue of Rouhault, and of the amniotic sheath.

G. Diemerbrœck, Wrisberg, Schrœger, and Michaelis have admitted the existence of *lymphatic vessels* in the cord, but no one has so fully insisted on their existence as M. Utini. M. Fohman says that he has often injected them, and that they form the largest portion of the cord. MM. Chaussier, Durr, Reuss, &c., think they have discovered nerves in it going to the solar plexus; but it is probable these authors permitted themselves to be imposed on by some remains of the urachus, the vitelline vessels or duct, &c. At least I have never been able, with all the pains I could take, to verify their assertions; a circumstance in which my researches agree with those of MM. Lobstein and Meckel. It is also well understood, although Fournier says otherwise, that the cord possesses no sensibility.

Although there is in man only one umbilical vein, as an ordinary rule, cases are cited where there were two, as occurs in a great many of the mammifera, and as Courtin has already observed. In other cases, instead of two arteries, only one is found, as Haller, Wrisberg, and Sandiford have seen. I have seen an instance of this sort, and M. Blandin has deposited a second in the Museum of the Faculty.

These vessels are not visible until the first fortnight of the second month after conception, and do not assume the spiral form until after the disappearance of the swellings of the cord, that is, from the seventh to the eighth week. The reason of this twisted appearance seems to me to be very plain; it depends on the rotatory movements of the child in the womb, and ten times out of twelve it turns from left to right, according to my own and Meckel's observations. In some subjects, the cord is turned in one direction near the placenta, and in the opposite one near the child's belly; most frequently, it looks like a real rope, and hence, doubtless, is derived its name, *cord*. Sometimes all three of the vessels turn on one ideal axis; at others, the vein is twisted round the arteries; but, in

general, the arteries are twisted round the vein. Morlanne has seen the vein and one artery twisted around the other artery.

It is altogether incorrect to say, with Reuss, and some other anatomists, that there are valves in the umbilical vein. I have been convinced of the contrary a hundred times by careful dissection. Rouhault has remarked that the dimensions of this vein are double those of both the arteries.

The common sheath that envelops them continues transparent for about two months, and during this period permits us very distinctly to see them in its centre; after which it grows more and more opaque as the pregnancy advances. I have already said that it does not exist at the commencement; it is seen to form by degrees between the first and the end of the second month, progressing from the embryo towards the root of the cord in the following manner: the amnios, at first much smaller than the chorion, and as if pierced with a circular hole, to allow the pedicle of the vitelline sac and umbilical vessels to penetrate into the abdomen, is afterwards reflected along the umbilical cord as the ovum enlarges, but so as not to afford a complete sheath to its vessels until the tunics of the fœtus come in contact with each other.

Notwithstanding that these vessels do not in general separate or divide until they reach the placenta, it would be a mistake to suppose they never do so. Their division may take place at the distance of one, two, or four inches from the inner surface of the chorion, and even very near the abdomen of the child. In this case their first divisions, diverging like the rays of a parasol, fall upon points pretty near the circumference of the placenta. Examples of this kind have been figured by various authors. I have seen one belonging to M. Deneux, and have two of my own. Wrisberg, Sandiford, and M. Lobstein have each given one. Morlanne says that he has met with two, and M. Benckiser has collected a great number in his thesis. In the case of Morlanne, the length of the cord was but thirteen inches; and Allan states that Lauverjat had observed a case similar to it. Those observers, who, like Van-der-Wiel, Schurig, &c., have supposed that a single fœtus might have more than one umbilical cord, have probably been misled by this anomaly, for it is pretty nearly certain that two cords never existed in the same subject.

In the scientific collections, may be found facts tending to prove that the belly is not the only point to which the cord may be attached; that it has been seen inserted upon the breast, the neck, the limbs, &c. But none of these observations are of a nature to enforce conviction; they should be received with great reserve, for they rather give evidence of the credulity of their authors than of what they wish to prove. However, there is at Brussels, in the anatomical museum of a gentleman of that city, a fœtus, with a cord inserted upon the cranium, and which J. Cloquet has had an opportunity of examining. If I might speak of a thing I had never seen, I should say the abnormal cord originally belonged to a second fœtus, and became accidentally attached to the cranium, that the natural cord also existed, and that the cranial cord did not penetrate beyond the integuments: I have seen one case that might give rise to ideas similar to those I am now combating. A monstrous fœtus, born at the seventh month, and for which I am indebted to the goodness of Madame Jagu, had the umbilical cord so disposed that at first view there seemed to be four of them; two of them departing from the belly and the other two from the breast. But it was only a natural cord, doubled several times, the angles of the folds of which had adhered to the membranes and also to the skin of the fœtus. In the case pointed out by Portal, the supernumerary cord fixed to the temple coincided with a fœtal monstrosity, and was nothing more, as the author presumes, than a roll of membranes.

ART. IV.—OF THE PLACENTA.

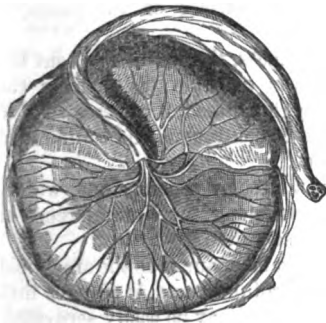
§ 1. DISPOSITION.

The *placenta*, thus named by Fallopius from its resemblance in shape to a flattened cake, is that part of the ovum which is found in immediate contact with the organs of the mother, and is continuous at its circumference with the reflected *caduca*. It is only found in the mammiferous animals, where it exhibits very various shapes. In the dog, it is a complete zone surrounding the entire chorion; the placenta of the ruminating animals is multiple, and presents itself to the view of the observer under the appearance of unequal and pedicillate masses. In the rodentia, it is composed of a circular plate formed of two layers, which are to a certain extent dissimilar. In the horse, it consists of a simple reddish and granular layer, which covers the whole extent of the chorion. In the human species, where I have particularly to examine it, it is a softish and spongy, flattened, circular, oval, or reniform body; its width, ordinarily from six to eight inches, is sometimes smaller and at others greater. A placenta, observed by Madame Boivin, measured twelve inches in one direction and nine or ten in the other. M. Berthelot cites another of fifteen inches, and we find a similar case in the work of Amand. Its thickness is also very variable, and, moreover, very unequal in its different parts; generally from one inch to an inch and a half at the centre, it goes on lessening towards the circumference, which is frequently only a few lines in thickness, but which is occasionally, in some points, thicker than the centre itself. When it is very wide, its thickness generally diminishes in proportion. It was reduced to two or three lines in the cases cited by Rigby, Schweighaeuser, and Madame Boivin. I have observed the same thing in a placenta the greatest diameter of which was thirteen inches.

As its diameters are from six to eight inches, it is useless to say that its circumference is from eighteen inches to two feet.

One of its surfaces, the *fetal, inner, smooth, vascular, membranous, &c.* surface, is lined by the chorion, which adheres to it, and by the amnios, which can always be separated from it by merely peeling it off. In spreading upon it, the principal divisions of the vessels of the cord form a very beautiful diverging network.

Fig. 17.



The internal or fetal surface of the placenta.

Fig. 18.



The external or uterine surface of the placenta.

Its other *external or uterine* surface, viewed in the womb or upon an entire ovum, appears porous and fungus-like, but even; neither cracks nor orifices of sinuses are seen; it only exhibits a few salient points; the anhistous membrane does not cover it; a simple pellicle lines it and covers its lobes.

When the placenta is out of the womb, this surface is, on the contrary, extremely uneven; lobes of various sizes are seen upon it, and they are separated by fissures of greater or less depth; and this happens because, in detaching and expelling the placenta, the uterus, by doubling up, lacerates the thin inorganic pellicle which concealed the intervals between its numerous cotyledons.

I have had nine opportunities of observing it *in situ*, and in none of them could I discover either sinus or opening having the least resemblance to what authors have described as such.

From the fourth month to the full term of pregnancy, the circumference of the placenta is continuous, without any decided line of demarkation, with the double layer of the caducous membrane. And this is doubtless what has led to the belief that the first-mentioned part of the ovum is only a thickened portion of the latter. In saying that the placenta is developed between the laminae of the caduca, Mr. Ingleby shows that he has never reflected on the arrangement of this membrane. I should have considered his assertion as an inadvertence, if Messrs. Stanley and Mayo had not supported his position, by stating that they had seen, in the Hunterian Museum, a portion of a placenta covered by a lamina of decidua on each of its surfaces. Has it not been remarked that the placenta is in part formed from the chorion, and that, besides this, the caduca does not exist on its foetal surface?

§ 2. COMPOSITION.

Warthon, opposed by Arantius, was one of the first to say that the placenta consists of two halves—one uterine, or maternal, and the other membranous, or foetal. If Warthon, and those who, as Hunter and Blumenbach, have adopted this division of the placenta, have not taken the ovum of the rodentia as their model, I am unable to discover in the human after-birth any appearances that could account for their mistake; which, besides, has been imitated by many of the moderns, and by Meckel, also, who says that the uterine portion of the placenta is much more firm than the foetal or internal.

It is sufficient to cast a glance on the porous surface of any placenta to be convinced that one of its halves has not remained adherent to the uterus; to remark that this surface is smooth, and covered with a thin lamella, noticed even by those who admit the double layer, in order to see that the fact is not so, and, indeed, cannot be so.

A. This *membranule*,* which covers the fungous surface of the placenta, appears to me to have been generally misunderstood.

As long as the placenta does not form a compact mass, that is, until about the sixteenth week, there is not a trace of the pellicle in question; as soon as the tomentose groups of the chorion become entirely agglomerated, it appears as if to cover their summits, and soon afterwards is found to be continuous and confounded with the reflected edge of the anhistous membrane.

It certainly contains no vessels, and the idea of a circular venous sinus, which, according to the reports of certain anatomists, exists along the circumference of the placenta, can only be the result of a careless observation.

The utero-placental pellicle is here disposed in the same manner as the arachnoid is on the brain. On the top of the projections and protuberances, it adheres intimately; whilst opposite to the spaces betwixt the lobes it may be easily separated, in the shape of a delicate transparent lamella: like the arachnoid, it also remains on the surface, and in general does not penetrate into the parenchyma. Its nature is similar to that of the pellicles, which soon after their formation cover almost all sorts of fibrinous concretions. It is not a tissue; it is destroyed by placing it

* It has been called the *placenta serotina*, and is supposed to be formed at a late period, and to increase with the increase of the placenta.—M.

in water, and after a few hours dissolves as readily as all the other membraniform concretions.

A coat of *deposit*, much thicker, more fragile, and not so smooth as the preceding one, surrounds all the vascular trunks; this is what has given occasion to the belief that the vessels of the placenta ramify in the very substance of the *caduca*; that the chorion is composed of several coats; that the anhistous membrane sends one lamina to the external, and another to the internal surface of the placenta; and that the delicate pellicle of the latter is doubled down between all the fibrillæ of its lobes and lobules. The lamellæ of which it is composed appear to me to be a concreted product of a peculiar exudation from the womb, the chorion, and its tomentose portion. In this respect, there is some analogy between them and the *caduca*; but they differ from it in this, that they are not to be seen until a long time after the ovum has reached the uterus, while the anhistous sac forms immediately after fecundation; and also in this, that one is very soft and somewhat elastic, while the others are dry, hard, and break almost as easily as glass.

B. The *glandular* bodies, to which Blancardi and Malpighi attributed important functions in the placenta, are no longer admitted by anybody to exist; those anatomists probably allowed themselves to be deceived by the primitive and natural granulations of the chorion. It is now pretty generally agreed to deny the existence of *lymphatic* vessels in the after-birth, although De la Motte is said to have established their existence, with Méry, at the Hôtel-Dieu, on a woman who died undelivered. The same is the case as to the *nerves* which Verheyen, Chaussier, Ribes, Home, and Bauer tell us they have seen.

However, Dr. Lauth has recently published a work tending to prove that a great number of lymphatic filaments of a peculiar kind pass from the placenta to the uterus. It is true that, when we carefully separate the ovum from the womb, we perceive an infinite number of small whitish threads, extremely easy to break: but it is also certain that similar threads are to be seen when separating the *caduca* from the surfaces which it lines, the amnios from the chorion, &c.; that these are merely gelatinous or mucous *tracts*, but not vessels, nerves, nor even cellular filaments.

The beautiful injections of M. Fohman seem, however, to settle the question in one respect. The plate annexed to his memoir proves, indeed, that the mercury passed sufficiently easily into the placenta, and into all the membranes of the ovum. But when we remark the statement of the author, "all that which is taken for cellular tissue, the transparent cornea, the conjunctiva, the internal coat of the vessels, the serous membranes, &c., are nothing more than the interlacing of lymphatic vessels," it is easy to perceive that his ideas of the absorbent system differ very much from those of other anatomists. It is also wrong that the filaments described by M. Lauth should be classed with the nerves by M. Carus.

C. The *blood-vessels*, therefore, compose the fundamental element of the placenta. These vessels are but expansions or ramifications of those of the cord, and, like those of the navel-string, are not developed until after the third week, and then by intussusception and gradually. Previously to this period, the villous matter of the chorion does not contain any of them, and this villous portion may until then be compared to the hairy parts of the root of plants. If it does take up any fluids from the surrounding parts, it must imbibe or absorb them after the manner of vegetables. At a later period, vascular channels are formed, as happens in new tissues. Being at first much smaller than the radicles with which they are surrounded, they do not seem to extend throughout the whole length of the chorion, even at a pretty advanced period of their growth. I have injected them with colored alcohol, size, spirits of turpentine, &c., at the third and fourth months, and afterwards examined them with the microscope, and although the injection had passed into vessels finer than those of the choroid,

it always stopped at a considerable distance from the extremities of the villous branches. This portion, which cannot be injected, has always appeared to me to be, like the primitive tomentum, unprovided with any central channel, to be of a spongy nature, and to absorb only by means of imbibition.

The bands and solid white filaments that are found in the placenta even after delivery, and which are attached to the chorion, are not, as some cotemporary authors too confidently assert, obliterated vessels: they never were hollow, and remain solid, as they were at the commencement. They are similar to those which connect the reflected portion of the anhistous membrane to the villous coat, and belong to some primitive branches of the villous coat of the ovule, in which no vessels were developed.*

Do the venous capillaries appear before the arterial? Is the contrary the case? The assertions of Bérard, of Meckel, of Lobstein, &c., concerning this point in anatomy, are anything but conclusive: having always met with arterial at the same time with venous branches, I am disposed to believe that both these kinds of canals appear together; and how could it be otherwise? If the blood enters in one, must it not return by the other kind of vessels?

Each vascular branch, in separating from the outer surface of the chorion, is composed of a single artery and a single vein, which are already twisted in a spiral manner; the trunk soon divides into two branches of each sort, and these again into two others, so that these dyotomic ramifications go on almost *ad infinitum*: being pressed together and united to each other by means of the fibrous layer, these divisions and subdivisions constitute a lobe, or cotyledon of the placenta. In ruminating animals, particularly in the cow, these lobes, being very remotely separated from each other, form so many distinct placentæ.

All the vessels of one lobe communicate with each other; but the experiments of Wisberg, which I have repeated, prove that they do not in general communicate with those of a neighboring lobe.

When any of these lobes separate from the others, and are at some distance from the placental disk, they form a small distinct placenta, and this has assuredly been the reason which has on more than one occasion led to the belief that there were two placentæ to one single fœtus. Mauriceau has seen them almost as large as the hand. Leroux cites a case of the kind. M. Deneux has seen two lobes thus separated in the same placenta. I have encountered three times these distinct lobes, simulating a supernumerary placenta, and many other practitioners have met with similar examples. Each one unites to those about it, as the different lobules of the same cotyledon are united among themselves; and their adhesion, which takes place in the third month, may easily be broken up at full term: being thus disposed, they constitute the parenchyma of the placenta, so that this parenchyma is entirely composed of vessels, of solid filaments, of granulations, and a fibrinous matter which serves as a common bond of union for them, but not of any cellular basis analogous to that of other organs.

MM. Dubois and Biancini state that they have injected the arteries, and probably the veins also, which pass from the uterus to the placenta, and *vice versâ*; Reuss has given a drawing of them, and Albinus had already noticed them; I have vainly sought for these *utero-placental vessels* in a great number of subjects, and the condition of the parts has convinced me that, if they do sometimes exist, they are far more frequently wanting. I can assure the reader that, whenever

* I maintained this opinion in the year 1823 (Archiv. Gén. de Méd., 1824), and have ever since continued to inculcate it in my public lectures on midwifery. I am, therefore, not without reason surprised to see MM. Breschet and Raspail, who have confirmed it by some recent microscopical experiments, endeavoring to attribute it to themselves, or referring it to Carus, who never spoke of it before the year 1827; M. Breschet should have recollected, however, that, while examining the granulations of the chorion with a lens in his study, in February, 1824, we discussed this subject, and that he was not then of my way of thinking.

I have examined the ovum in the uterus after the third month, its surface, as well as that of the womb, was smooth throughout its whole extent, and that not a single vessel served to maintain the connection between these two parts.* Might not the learned authors whom I have mentioned have been deceived by some anomaly, some pathological state, or some false appearances? The observations published since the first edition of this work, by MM. Seiler, Lee, and Radford, lead me to think that these physicians have evidently taken a portion of the inner surface of the womb for the external caduca. Could I have been mistaken myself? Time and additional facts alone can resolve this question, which I leave for the curious.

§ 3. DEVELOPMENT.

It has been said that, when the ovule reaches the womb, there appear on its external surface certain branching villi which penetrate through the anhistous membrane so as to come in contact with the womb, and that the placenta is formed in this manner; that these villi, at first regularly disseminated over the entire surface of the ovule, soon begin to collect in groups, and to assemble together at one point, while every other portion becomes smooth and transparent; that the placenta cannot be distinguished until after the end of the second month; that it then covers two-thirds or at least one-half of the ovum; and that its proportional breadth becomes less and less as the pregnancy advances, &c.

The following is an account of what we do observe: After gliding betwixt the inner surface of the womb and the caduca, and becoming attached to the organ destined to contain it until the end of pregnancy, one-half of the villous vesicle is necessarily in contact with it, while the other half pushes away the anhistous membrane. From this moment one disk of the ovule is left in direct contact with the living surface, without the interposition of the deciduous membrane, and here the placenta is developed: this is the only spot in the womb at which the germ can take up the principles of its nutrition, resembling in this respect a vegetable enclosed in a vessel, and having no communication with the earth save by a small opening at the bottom.

It is then evident that the placenta in some sort begins to grow as soon as the ovule reaches the uterus, and not merely after the two first months of gestation; that the relative dimensions of it, and the whole ovum are about the same from first to last; and that it is consequently incorrect to say that it covers more than one-half of the chorion at the second month, but at a later period only a third, a fourth, &c. I have reason to believe that it constantly augments in the same proportion as the surface of the womb with which it is in immediate contact; so that its width at birth depends upon the size of the uterus, or the dimensions of the point left exposed by the decidua at the commencement of gestation.

§ 4. INSERTION.

It is well known that the placenta may be attached either to the fundus, the front, the back or sides, and sometimes to the neck of the uterus; but hitherto the cause of these anomalies has not often been inquired into. Those who say that it attaches itself to the most vascular part of the uterus make an assertion that is void of sense; for, admitting that the ovule is at first entirely concealed in the centre of the decidua, as several authors have stated, and still continue to assert, who is to tell that the villi of the womb are more favorably disposed for its reception in one place than in another? Since observation proves that the villi at first cover the whole vesicle, instead of growing on one portion of it, why

* I have carefully witnessed the anatomical separation of the ovum from the womb at full term, and could never see the smallest vessel passing from one to the other. I do not believe that there is any utero-placental circulation appreciable by the senses.—M.

should not the placenta occupy more or less regularly the whole superficies of the ovum instead of covering only one-fifth of it?

Had Osiander, Stein, and some other writers reflected more carefully upon the subject, they doubtless would not have advanced the opinion that the point of insertion of the placenta depends upon the specific weight of the fecundated ovum, and, consequently, on the attitude assumed by the woman immediately after impregnation. Indeed, two remarks suffice to overthrow this system: 1. As the vivified ovule does not leave the tube for eight days, it is manifest that, until then, the attitude of the woman is a matter of indifference as to the point in question; 2. Be the time what it may that is considered necessary for the germ to pass from the ovary to the womb, it is clear that it will find the woman on foot more frequently than in any other posture, and, if the idea of Osiander is correct, that the implantation of the placenta over the cervix, instead of being very rare, ought, on the contrary, to be the commonest of all.

I think I have discovered a much more natural explanation of this phenomenon, and shall venture to submit it to the examination of naturalists. Upon entering the womb, the ovule necessarily meets with the anhistous sac, and can proceed no farther without detaching it; now, if the adhesion of this sac is the same throughout, the vesicle follows its original direction, glides along the fundus of the womb, which, with the assistance of the decidua, seems to prolong the channel of the tube to that of the opposite one, or else it stops as soon as it issues from the tube, and then the placenta attaches itself to one of the angles of the uterus. If the adhesion is stronger above than it is below, we may conceive that the ovum will descend more or less towards the cervix; if the adhesion be strongest in front, it will be directed backwards, and so of the other points. This hypothesis is further confirmed by direct observation. Of thirty-four women who died while pregnant, or soon after delivery, at the *Hôpital de Perfectionnement*, I found, upon examining the parts, that the centre of the placenta corresponded to the orifice of the tube in twenty cases; it was in front of it in three cases, behind it in two, below it in three, and in six cases only, towards the fundus of the uterus. M. Godron, who, with M. Stoltz, attaches, in its relation to the anterior surface of the embryo, the placenta to the internal face of the chorion, does not appear to me to have a sufficiently correct idea of the caduca and of the original arrangement of the cord, for his opinion on this subject to be of great value.

§ 5. MODE OF UNION.

The *mode of union* betwixt the placenta and the womb is another point that has occupied much of the attention of physiologists: Northwyck, Astruc, Hunter, Mery, and Baudelocque thought that the large venous trunks of the womb were uninterruptedly continuous with those of the placenta.

Warthon, Reuss, and a great many of the moderns, suppose that the part of the womb which is in contact with the ovum at the commencement of gestation becomes fungous; that these fungosities, which constitute the uterine placenta, intermingle and unite with those of the chorion, from which arises an intimate adherence, which the womb must tear off before it can expel the after-birth. A. Leroy goes so far as to say "that the placenta at first is composed chiefly of the inner surface of the uterus."

According to Stein and Astruc, the lobes of the placenta are impressed into the womb like a seal into soft sealing-wax, and the ramifications of its vessels are implanted into the largest vessels of the womb, pretty much as the roots of a shrub are implanted into the earth. Asdrubali thinks that the placenta adheres to the womb in the same manner as the pulp of a peach clings to the stone. Leroux maintained that it is in the same way as a leech attaches itself to the skin; others have said that it is like the graft of a tree, that it is effected by means of an accidental cellular tissue, of peculiar vessels, &c. &c.

It appears to me that what I have said above concerning the structure of the external surface of the placenta proves that none of these hypotheses are rigorously correct. I may repeat, with Madame Boivin, that in several women who died whilst pregnant, the membrane which covers and unites the lobes of the placenta appeared to me to be the only bond between it and the womb. I have remarked, further, that the adherence of the ovum was the same everywhere; that it may be destroyed with the handle of a scalpel without the least difficulty, and without rupturing anything save some mucous tracts like those found between the amnios and chorion, between the croup membrane and the membrane that secreted it. The error of the authors upon this subject manifestly depends upon their having but few opportunities of examining the ovum in the womb, and especially upon this: viz., that in women who die a few days after delivery, the internal surface of the last-named organ remains swelled and fungus-like at the part that corresponded to the placenta.

Moreover, many parts of the fœtus may be adherent to it. We see, in the thesis of Lafize, that, in a fœtus of about seven months, obtained by Collin, the 25th September, 1760, the placenta was united to the vault of the cranium, all of the flat bones of which were wanting. In the fœtus seen by Costallat, it was attached to the face and front part of the head. A very similar case was communicated some years since to the Academy of Medicine, by a physician, de Chateau-Renault. The superciliary ridges of the frontal bone were wanting, and the placenta adhered to the cranium. M. Lauroy, an observing author, says that he has seen it adhering to the hairy scalp, and that the child lived thirty-two hours. Chaussier has seen it fixed to the belly of the fœtus, which was bent on itself, and the pelvic extremities of which were attached to the back. In another case, it adhered to the liver. Yet this disposition almost always coincides with some other monstrosity of the fœtus.

CHAPTER II.

MULTIPLE PREGNANCY.

AFTER what I have said heretofore of the different parts of the ovum, I may dispense with entering into any considerable details relative to double pregnancy. If two ovules reach the womb, each by a different tube, or if they attach themselves to it at a certain distance from each other, they will each have a distinct placenta, chorion, and amnios, and sometimes even an epichorion, until a certain stage of the gestation. If, on the contrary, they had already contracted some adhesion together previously to leaving the Fallopian tube, or if they happen to remain very near each other in the uterus, it may be that they will be enclosed in one single leaf of the decidua, and that their villi, as well as their chorion, will be early confounded together. In this case, it may be that the septum formed by their conjunction shall give way, and cause the two fœtuses to be found enclosed at birth in one single bag of membranes, numerous instances of which are related in the scientific collections, and of which one of the most authentic has been recently laid before the public by Madame Boivin. Nevertheless, such a circumstance is of very rare occurrence, for in double after-births I have always succeeded in tracing the chorion and amnios to the intermediate septum, where the two membranes were more or less promptly confounded, and in a more or less intimate degree. In a double ovum, of about three months, for which I am indebted to the politeness of M. Moncourier, I found not only the chorion, amnion, and placenta, but also the umbilical vesicle of each fœtus, although the two ovules had become united to form an intermediate septum.

Of the four varieties established by M. Guillemot, the first and second only really exist in the beginning, still that in which there exists a single chorion for more than one amnion seems to me to be very rare. I do not know whether the third, or that in which the two embryos have been found in the same envelope, has been really observed. As to the fourth, that is to say when the two ovules exist one within the other, we can only admit it under the head of monstrosity. Brendelius says that in a case of triplets seen by him, a single chorion contained the three amnios. Levret also says that, where there is but a single chorion for the two amnios, the external layer of the chorion is common to the two fœtuses; but there is reason to doubt whether these two authors have fixed exactly the relations between the chorion and the amnios. We may say as much of Van-der-wiel, who speaks of an aborted ovum, contained in the after-birth of another fœtus, and of Richter, who has observed a similar case. The four cases of this kind, which I have had an opportunity of studying, lead me to suppose that the small fœtus has at least its amnios, if not its chorion, inside the other. That the two fœtuses should be found in the same envelop, either in consequence of the wearing away of the membranes, or from a rupture of the intermediate septum, or from an original disposition, does not occur the less frequently, nor is it a more remarkable monstrosity, than that they should become united, the one to the other, in some part of their surface.

Furthermore, the two ova are sometimes so entirely distinct from each other in a multiple pregnancy, that they frequently escape, or may be taken away one

without the other, during labor, as is seen from the observations of Saviard, Mauriceau, Peu, Pinart, and Chapman. Most usually, however, they adhere to each other, or are joined together at some part of the placenta or membranes, although their cavities are perfectly separated. It is doubtless thus that we must understand the five separate sacs observed by Weiss, in the same specimen. In general, the vessels of the two placentæ do not communicate with each other, any more than the vessels of the different lobes of the same placenta; but it is easily conceived that the contrary may take place sometimes, as seems to be demonstrated by facts carefully examined.

In conclusion, this communication takes place in the large branches, on the foetal surface, and almost never in the thickness, or on the uterine face of the placenta. The anastomosis took place in this way, in the case cited by Smellie, and perhaps, also, in the two of which Levret speaks, in that of Sultz, in that of Désormeaux, in one of Moreau, and in the three cases which I have observed, two of which were before the fifth month.

As to the cords, their number is determined by the number of children. If the branch which runs from one placenta to the other, in the specimens figured by Van-der-wiel, that which forms the third cord to the placenta of twins, is anything more than an anastomosing loop, as in the preceding cases, it is difficult to explain what it is. Mery speaks of a case which it is still more difficult to understand. A single cord, passing off from the placenta, divides into two branches to run to each foetus, only a few inches from its origin.

Thus, when each ovum is attached separately to the uterus, a single uterine decidua forms for each a decidua reflexa, and under these circumstances, the placentæ remain distinct throughout. Supposing that there is but one chorion, the caduca is arranged as in a simple pregnancy, and the placenta appears to be also single. There is only a line and a slight groove on its exterior, indicating the demarkation, while the remains of a septum are almost always observed on the interior. It is in this variety that the anastomosis of the cords is seen to exist most frequently. The union of two foetuses does not occur unless in ova in which the septum is absent. We perceive from the preceding that twins of the same sex are far from being always lodged in the same sac, as Viardel seems to think, and that it would be incorrect to assert, with Mauriceau, Peu, and Dionis, that each foetus has always separate membranes.

CHAPTER III.

EXTRA-UTERINE PREGNANCY.

If the chorion and amnios offer nothing peculiar in extra-uterine pregnancies, it is not the same with either the decidua or placenta. Many observers have remarked that the interior of the uterus is thus lined with the caduca, as in natural pregnancy; but this opinion is only established to a certain point. Quite often the uterus contains nothing which can give an idea of a caduca. To the examples which I have related elsewhere, I can add those which were shown to the Anatomical Society by MM. Bonnet and Gaussail. Indeed, the matter effused does not present the form of a membrane or sac. It is a soft, pasty, adherent, thick substance, which we can only separate from the parietes of the organs by scraping, as we do the scurf from the tongue for example. This matter is reddish, and has no resemblance to a sac, according to the observations of Littre. It was purely gelatinous in one of the women spoken of by M. Doudement. It was the same in two of the cases which I observed. Nothing proves that there was anything else in a single specimen of the three extra-uterine pregnancies, in which M. Blundell said that he met with the appearance of a decidua. In fine, the fact which served as the theme of the excellent thesis of M. Huber proves also that the womb was filled with a spongy substance instead of the caduca. It was the same case with the specimen which I studied with M. Dupré, in December, 1833. M. Cruveilhier says, also, that there existed no uterine decidua in the cases of extra-uterine pregnancy observed by him.

Surrounding the ovum, which may be in the tube or elsewhere, it is not a decidua with two layers, but a simple anhistous, unequal, and friable deposit with which we meet.

In such a case, the placenta is entirely free, being due to the projections of the vascular ramifications of the cord, and is very irregular, and generally very thin. The pellicle on its external surface is usually wanting, and the adhesions of its fibres to the walls of the foetal cyst are ordinarily more intimate than when in the uterus.

As to the cyst itself, it naturally differs according as the germ is developed in the tube or peritoneum. In the first case, it is altogether constituted of the natural tissue. In the second, on the contrary, it is formed of several kinds of tissue, after the escape of the ovule. We find the external surface of a serous character, an internal one irregular in composition, more or less villous, and an intermediate fibro-cellular tissue, as if *lardaceous* in certain parts, and in the substance of which may be sometimes seen vessels of considerable size.

PART II.

OF THE FŒTUS.

CHAPTER I.

SIMPLE PREGNANCY.

THE ancients retained the name *γόνι*, seed, for the product of conception for the first six days. During the next nine days they called it *εμβρυον*, then embryo for twelve days, after which they made use of the term *παιδιον*, to designate the foetus until the forty-fifth day, and these four supposed periods were characterized by them in the two following verses:—

Sex in lacte dies, ter sunt in sanguine terni,
Bis seni carnem, ter seni membra figurant.

At present, it is generally agreed to give to the germ, when without its membranes, the name of *embryo*, until the third month of pregnancy; or, according to some, until its several parts can be distinguished from each other: it is afterwards called *foetus* as long as it remains in the womb; and the term *child* is not applied to it until after its birth. Although this division is entirely arbitrary and difficult to justify, I feel bound partially to conform to it in this work.

SECT. I.—OF THE EMBRYO.

ART. I.—THE EMBRYO IN GENERAL.

The period at which the embryo first appears in the uterus is still enveloped in darkness, and vain attempts have for twenty centuries been made to penetrate the mystery with which it is surrounded. At the sixth day, says Hippocrates, the semen is changed into a transparent bubble, in which a very small point appears, which is probably the navel. According to Haller and most of his pupils, the embryo is not perceptible until the fifteenth or twentieth day. Of those authors, who, with the ancients, suppose that fecundation takes place in the womb, a part maintain that the embryo is formed first, and the membranes afterwards; others teach that the membranes, on the contrary, appear first; yet no one has succeeded in showing on what day the embryo begins to be visible. Again, the ovarists and animalculists are in the first place far from agreeing with each other; and we cannot perceive that the proofs they adduce in support of their assertions are much more satisfactory than those of the partisans of the ancient hypothesis. Finally, the opinion of Haller, which had been generally adopted as the most probable, has been lately very much shaken by the publication of a fact which has been supposed to be of a nature to dissipate every uncer-

tainty; I allude to the case recently made public by Messrs. Home and Bauer, at London.

However, the sensation produced in the scientific world by this case seems to me as extraordinary as it is difficult of comprehension, and can only be explained by the urgent desire that is felt to escape from the uncertainty that still prevails in science upon this interesting point in natural history.

Nothing certainly proves that the corpuscle, which was found by Home and Bauer in the midst of a mass of coagulable lymph, was a germ rather than anything else.

The experiments of R. de Graaf and Nuck, repeated by Duverney, Hayghton, and Cruikshank, if they are accurate, have long since demonstrated that the product of fecundation in animals is a vesicle, and that this vesicle takes some days at least to pass from the ovary to the womb. It is true we are ignorant whether the time that elapses between the vivification of the germ and its arrival in the womb is always the same in the same animal, or whether there is any fixed and certain time for the different species. Nor is it by any means proved, although Diemerbroeck and some modern observers have so stated, that the non-fecundated ovules actually reach in the same way the cavity of the organs of generation. But it appears that this term is three days in rabbits; and, according to MM. Prévost and Dumas, who have lately made numerous researches on the subject, that it is from six to seven days in the bitch.

A like simple remark suffices to attach a true value to the assertions of Hippocrates and Mauriceau, who say that at the seventh day all the parts of the foetus are visible. It shows also what should be thought of Autenrieth, who pretends that he has measured an embryo one week old, of Walker, who saw it in a mucilaginous condition in the womb even at the eighth day, of the observation of Dr. Home, and of some of those of M. Pockels, still quoted by M. Granville.

Strato and Diocles, as Macrobius informs us, supposed that the foetus does not begin to assume the human form until about the thirty-fifth day, when it is as large as a bee. Aristotle teaches that at forty days the embryo is of the size of a large ant; and that we can distinguish its limbs and all its parts, even the penis, if it be a male. Deleurye thought that it has at first the form of a lizard. It has been stated by others, but less correctly, that from the fifteenth to the twentieth day the embryo is vermiform, oblong, or tumid in the middle. The same may be said of M. Meckel, when he asserts "that the part that first appears corresponds almost exclusively to the trunk; that the embryo is almost entirely straight." Ph. Béclard has fallen into the same mistake in reproducing the idea of the celebrated German anatomist. Nor has M. Adelon been more fortunate in admitting, with Denman, that the embryo exhibits no traces of a head at three weeks, and that the belly appears under the form of a conical projection resting on the inner membrane of the ovum. Nor do I understand why Chaussier affirms that, "at the tenth day, the embryo is merely a grayish, semi-transparent flake, easily liquefied, and of a form difficult to determine." It is also certain that, when comparing it, with Ruysch, to a lettuce-seed, or a grain of barley, as Burton did, or even to the *malleus* of the ear, like Baudelocque, they could have had before them only preternatural specimens. Nor should it be compared to a grain of wheat. It exists in the perfect ovule of twelve days, of which this is the proof. A *sage-femme* was in her last days of menstruation when her husband returned from Rouen, where he had passed two months. Intercourse occurred between them only on the next day, and on the thirteenth day this woman, already the mother of six children, miscarried. The ovule, which she at once showed me, may have been of less, but it could not have been of more than twelve days. In it the embryo was very distinct, as were also the vesicles and all the membranes.

ART. II.—THE SPINE.

Previously to the end of the first week, there is a striking resemblance between the human embryo and that of some of the serpents, putting aside the proportional length. It is a curved body, forming nearly a complete circle, which in this state may be two or three lines in diameter, but which, if straight, would be at least four or five. One of its extremities is bulbous and rounded, and the other terminates in a point. Being hollow and semitransparent, this stock seems to be filled with a limpid fluid, in the centre of which may be seen, even with the naked eye, an opaque filament, of a white or yellowish tint, which represents the cerebro-spinal system.

Numerous observations made on very young embryos seem to me to prove: 1st, that the rachis is the fundamental part of the body; 2d, that it appears previously to any of the other organs; 3d, that for a considerable time it exists alone; 4th, that its form does not essentially differ from that which it possesses during the remainder of its intra-uterine life; 5th, that for twenty days, or a little longer, the embryo is neither straight nor enlarged in the middle; 6th, that the head and neck constitute at least one-half of its total length; 7th, that the younger it is, the more does its curve approach to the form of a circle; 8th, that the appearances of its external circumference differ very little at first from what they are at a subsequent period, while its interior *contour* or concavity merits the most serious attention, on account of the changes it must undergo.

In fact, the organs appear in succession upon this concave surface; at first the different parts of the face, then the limbs, and between these latter the thoracic and abdominal viscera. Nothing is so admirable as this development; it might be called a real vegetation; the lower jaw, the members, the mass that is to occupy the abdomen and the breast, increase and come forwards, like buds springing from the branch of a tree, or *axillæ* of a plant.

The spinal circle thus fills up by degrees. The forehead becomes farther removed from the coccyx. The thoracic and abdominal portions of the original stock are forced to become straighter. The head remains constantly inclined upon the breast, but in such a way, however, that the chin at last takes the situation previously occupied by the forehead. The coccyx does not retire backwards until a very late period. The development of the pelvis and lower extremities gives it that direction.

From seeing that the lateral and anterior portions of the body do not become manifest for a considerable length of time after the vertebral frame, I have more than once been tempted to believe that the organic evolution really takes place from the sides towards the median line; but attentive and frequently repeated observation compelled me to abandon this hypothesis. In the median line of the face and neck I never could discover any void. I have found it to be as completely closed at the twentieth as at the sixtieth day. Nor have I even seen the thoracic organs entirely exposed. Although the mass from which they grow seems to be covered, as far as the belly is concerned, only with a very delicate tissue, the parietes of the chest exhibit their natural appearances as soon as they can be distinguished.

ART. III.—OF THE HEAD AND ORGANS OF THE SENSES.

At the beginning, the *head* resembles a very long club; its subsequent growth is proportioned to that of the rachis; but the appearance of the abdomen and thorax soon occasions it to lose a portion of its apparently enormous size. As neither the face nor chest exists at first, there is in fact no neck at the commencement of embryotic life. At five weeks the face is very distinct from the cranium, and the head, quite isolated, no longer resembles a mere pyriform enlargement;

and its cranial portion also permits us, most commonly, to discern in the vesicle which it constitutes, the general arrangement of the encephalon. Its facial portion is already quite opaque.

§ 1. THE MOUTH.

The mouth is the first organ of the senses that can be perceived; I have found it in the youngest embryos that have fallen under my notice. Consequently, it exists from the twelfth to the twentieth day, and then forms a very large, elliptical or triangular opening. As the upper jaw is very projecting, while the lower one, on the contrary, is very short, it follows that the mouth of a human embryo bears a striking resemblance to that of a young snake.

Anatomists have never altered the ideas they had formed as to the manner in which the lower lip is constituted; they have all supposed that it was primitively composed of two lateral portions, which at length united at a middle line, like the two bony pieces which support it; but it is not so with the upper lip. As long as it was thought that the upper jaw consisted only of two pieces, it was supposed that the corresponding lip must be also formed of only two pieces. But since an intermaxillary bone has been discovered in the human skeleton, it is generally agreed that the lip is formed of three portions, one middle tubercle and two lateral parts, which by their union give rise to the two columns, or nasolabial ridges. This is the theory upon which modern writers account for the formation of simple or double hare-lip, which, according to them, should never be met with exactly in the middle of the lip; finally, still improving upon these divisions, which are already too numerous, it has recently been asserted that the upper lip is developed from four separate points.

I think I may venture to affirm that such ideas, embracing that which M. Monod presents, could only have arisen from observations not attentively made, or too rarely repeated. In the course of the period I am now examining, the lower lip begins to be perceptible; the chin causes the middle of it to project forwards; but its loose edge, which is pretty thin, is not interrupted by any slit, and represents a very regular semicircle; it is longer, and has a deeper curve than the other. In fine, in the embryo of six weeks, as in those a little above twenty days old, I have found the edges of both lips perfectly formed, and without any division whatever. I am also forced to call in question the existence of the intermaxillary bone, in the human subjects in its normal state.

§ 2. THE NOSE.

It is incorrect to say that the organ of smell cannot be recognized until towards the sixth or eighth week. At thirty days it is often in our power to distinguish its anterior openings, which are round, situated immediately above the mouth, look directly forwards, and resemble two blackish spots. However, neither the nasal protuberance, properly so called, nor the naso-palatine vault, exists as yet. It is true, nevertheless, that, in several embryos of from five to seven weeks, the orifices of the nose were not very evident to me, while a very decided eminence already occupied its place.

§ 3. THE EYES.

The organs of vision appear at the same time with the mouth, if not earlier. I have distinguished them in embryos not exceeding four lines in length, and they are never sought for in vain in the course of the fourth week. At this period their structure is surprisingly simple, if compared to what it must become at a later period. Without lids, canthi, or lachrymal apparatus, resembling a circular disk half a line in diameter, and slightly convex, the visual bulb is separated from the surface only by a slight, superficial, and very narrow groove, which can only be found by searching for it with a needle. Two spots seem to

constitute it entirely: one, of a yellowish-white, composes the centre; the other, of a black color, exhibits the appearance of a circle, on the one side enclosing the former, and on the other continuous with the integuments. The central spot is at first much larger than the black circle that surrounds it, but in general the latter seems to me to exceed the former in size towards the end of the sixth week. The whole indubitably represents the sclerotica, and the transparent cornea, which is still completely opaque, and seems not to differ from the nails, except as regards its color. It might in fact be called a portion of skin or epidermis that becomes modified according to the wants of the system. Far from being directed in front during this period, the eyes are, on the contrary, turned very much to the sides of the head, as is the case in a majority of quadrupeds.

§ 4. THE EARS.

The ear also appears very early; it is distinguishable on the thirtieth day at the latest, and undergoes no remarkable changes until the sixth or seventh week; at first it looks like the simple orifice of a cutaneous follicle, or a shallow and narrow pyramidal depression; some days later it might be mistaken at a first glance for a leech bite, excepting that it has four angles instead of only three. There is no trace nor rudiment of the auricula; its opening is on a level with the skin, and, like the eye, the organ of hearing appears to be only a modification of a point on the tegumentary surface; from the fifth to the sixth week the inner angles of this crucial or rhomboidal depression begin to rise above the level of the skin; the tragus appears first, then the anti-tragus, and after that the rest of the concha. All these parts grow by a sort of eccentric vegetation; and it is some time before they incline towards the head, and dispose themselves in regular order.

ART. IV.—OF THE MEMBERS.

I have in vain endeavored to learn which of the members appears first. Whenever I have been able to distinguish the thoracic appendages, the pelvic extremities were equally visible. Neither have I found in their dimensions such great disproportions as are mentioned by authors. At first there is only a small interval betwixt them. The former emerge from the anterior part of the lateral bands of the spinal trunk, at about an equal distance from the top of the head and the point of the coccyx, supposing the embryo to be straightened out. The latter are seen about one line above the coccyx, which is curved from behind forwards, and concealed, as it were, in the space between them.

As long as none of the abdominal or thoracic organs are yet developed, they are not so near to the convex as to the concave surface of the spinal circle; but the roots of them seem to be farther backwards, as we pass farther and farther beyond the fourth week.

The hand is seen first in the shape of a sort of pallet, with a loose and thin but undivided edge. The foot does not sensibly differ from it. These two parts have a slightly concave surface, which is turned towards the median line. Their edges, which are somewhat inclined towards each other, look chiefly in a forward direction.

From the thirtieth to the fortieth day the forearm and the leg are visible, and the points of the fingers begin to emerge. At forty-five or fifty days the elbow and arm begin to detach themselves from the breast, to which they had been before attached by means of a membrane. The heel and knee also become evident; nevertheless, the thigh appears very short, as well as the arm, which doubtless depends upon its not being as yet completely detached from the sides of the abdomen. All the fingers are very distinct, and the gelatinous substance which unites their base no longer extends as far as their ends; the foot ceases to

resemble the hand; the toes are arranged differently from the fingers; in one word, these two organs exhibit nearly the same characteristic appearances they are to have at birth. It is manifest that one is designed for the purpose of standing, and the other to be used for the prehension of objects. This peculiarity alone might serve completely to expose the absurdity of those sophists who have insisted that the primitive mode of walking, in man, was similar to that of brutes.

ART. V.—OF THE COCCYX AND GENITAL ORGANS.

From the foregoing, it will be seen that, during the first three weeks, the trunk terminates by a vermiform extremity, and this sort of sacro-coccygeal tail, which is bent very much forward, becomes straighter as its cavity becomes more filled up. I ought here to remark that its edges soon become continuous with the abdominal mass, or are concealed by the roots of the pelvic extremities. The space between it, the insertion of the umbilical cord and the feet, the extent of which, until the fifth or sixth week, scarcely exceeds a line or a line and a half, retains for a considerable time the appearance of an excavation; it is subsequently filled by the gradual growth of the genito-urinary organs; and the development or concentric increase of the abdominal parietes and sides of the coccyx and sacrum at last completes it.

Towards the fortieth or forty-fifth day a black point is distinguishable in front of the coccyx, and indicates the situation of the anus; a little more towards the umbilicus may be seen a conical tubercle, with a groove on its inferior part, constituting the rudiment of the clitoris, or penis, according to the sex of the fœtus. A slit which is of sometimes greater and sometimes less breadth and depth extends from one of these points to the other. In several instances, however, I have thought that the intervening space in well-formed embryos was smooth; so that, up to its period, there is nothing to point out the difference between the sexes: we are tempted to suppose that every fœtus belongs to the male sex, for there is in fact neither labia nor scrotum, and the sub-pubic prolongation is alike in all specimens.

ART. VI.—THE UMBILICUS AND SECOND EMBRYONIC PERIOD.

Properly speaking, there is no navel until the fifteenth or twentieth day, and the cord merely proceeds to be lost beneath the visceral mass of the abdomen. However, the parietes of the abdomen, gradually increasing towards the omphalo-placental stem, soon afterwards give birth to it.

After the sixth week, or the fiftieth day, the organization of the embryo becomes rapidly perfected. The eyes become more convex; a very distinct palpebral circle soon afterwards surrounds them; the two extremes of the vertical diameter of this circle, by gradually approaching each other, soon give it the form of an ellipse, and thenceforth the two angles of the eye are observed to exist. In nine or ten weeks at latest, the edges of the eyelids are in contact, and so closely in some specimens, that several authors have supposed that adhesion had taken place between them. Previously to coming in contact, they were thin and sharp; but their thickness now exceeds that of the eyelids themselves; they completely cover the front of the eye, but are so transparent that its color may be easily distinguished through them. The central spot before mentioned grows yellow and enlarges; one is easily convinced that it constitutes the cornea, and that its posterior surface is in contact with a substance of the same color. The blackish circle is also enlarged, and being extended farther backwards, is found to belong to the sclerotica, and that its tint depends upon the substance that lines it internally.

The nose, particularly, undergoes remarkable alterations: the protuberance

which it forms above the lip, increasing by degrees, forces its anterior opening to incline gradually downwards. Its internal surface, which until the fifth week composes a part of the buccal cavity, begins in the course of the sixth to be separated from it.

The *mouth* does not undergo any essential changes. Its depth increases. The tongue which, as M. Froriep has clearly observed, appears at an early period, grows larger and thinner. The lower jaw projects more, which renders the anterior cervical notch more manifest. The lips are more distinct, and more isolated, but their form is the same.

The external ear, reduced to the appearance of a leech bite, in an embryo of four or five weeks, soon acquires its proper characters. Every part of its concha is unfolded. After the tragus and anti-tragus, we observe the slit of the helix to appear, and consequently the concha. The lobule soon manifests itself as well as the rest of the helix, with which it is continuous; and lastly, the anti-helix itself is visible as early as the seventieth day. Although all these parts are formed behind the meatus auditorius, the ear nevertheless seems to extend forwards during this whole period, and to approach much nearer to the angles of the mouth and eyes.

The *members* very early reach the form of their perfect state; in eight or nine weeks the fingers are all separate, or only adhere to each other by a transparent gelatinous substance; their three phalanges are distinguishable, and tend already to bend towards the palmar surface of the hand; the last phalanx exhibits upon its dorsal surface a spot which must be considered as the rudiment of the nail; certain opaque lines indicate the situations to be occupied by the bones of the metacarpus. The proportional length of the arm and thigh, as respects the forearm and leg, is no longer extraordinary. The germ of the shoulder and hip cannot be overlooked.

The *coccygeal* point is more completely concealed by the pelvic members, and projects less than it does a fortnight later. The anus ceases to exhibit the appearance of a blackish, depressed spot; at sixty days it forms a small conical projection, not perforated, and of a more or less intense yellow color. The genital tubercle continues to increase in length, and its base is surrounded by a very thick cushion; at some distance from its extremity is seen a circular groove, which corresponds to the corona of the glans. The channel along its inferior surface is in a great many embryos entirely shut, but in some it is still prolonged in the form of a slit to within one line of the anal tubercle. The development of the perineum, of the pelvis, and hypogastrium occasions the cord which in the first period appeared to be inserted betwixt the inferior extremities, very near the coccyx, to remove to a considerable distance from those parts, as it approaches nearer to the centre of the abdominal protuberance. The circle of the umbilicus at last unites so intimately with the cord which passes through it that there is no longer any line of demarkation between the teguments of the one and the membranous sheath of the other. Then if, as until birth, the size of the belly appears to be enormous, it must be attributed in part to the circumstance that the organs contained in the pelvis on the one hand, and in the thorax on the other, do not attain their perfect development until a very late period.

ART. VII.—OF THE DIMENSIONS.

As the embryo is curved forwards while it remains loose in the centre of the ovum, it seems to me that it ought always to be placed in this situation when we undertake to measure its length. How can we otherwise obtain determinate results? If, during the first six weeks, we should attempt to straighten it out for the purpose of measuring the distance from the vertex to the os coccygis, the front of the neck and the abdomen would rarely fail to be lacerated. At two months, the firmness of the parts mostly enables us to avoid such an accident, but, as the fœtus

may be either more or less straight, there will arise numerous discrepancies in the results. The habitually flexed state of the lower extremities renders it too difficult to extend them so as to comprise their length in a rigorous admeasurement of the embryo.

Authors not having informed us which of these methods they adopted, it is useless to look further for the reasons of the discrepancy observable in their accounts of this subject. It is true that the most minute precautions will not permit us to specify, within one line, the length of a foetus more than a month old; but happily, such a degree of precision can be a matter of small moment in the eyes of the observer. In the present instance, the measurements that I shall point out must in general be understood as applying to the embryo in its naturally curved position, that is, the space extending from the occiput to the coccyx; and I believe this diameter never exceeds eighteen or twenty lines before the end of the second month. I am consequently obliged to avow that M. Richard confines himself to reasoning alone, in all that he has said concerning the foetus, in a thesis otherwise excellent. Indeed, direct observation does not allow him to state that an embryo of some days is a line and a half in length, that its neck is seen, and that it has no limbs, that its greatest length is only five lines at forty days, seven lines at forty-six days, ten lines at fifty-two days, and one inch at fifty-four days.

Measurements taken from a considerable number of subjects have given me the following results: That the measurements at twelve days are three lines; at some fifteen or twenty days, five or six lines; at one month, from eight to ten lines; at six weeks, from one inch to fifteen lines; at two months, from eighteen to twenty-four lines; at three months, three inches; at four months, five inches; at five months, from six to seven inches; at six months, from eight to nine inches; at seven months, from nine to ten inches; at eight months, from ten to eleven inches; at nine months, from eleven to twelve inches. The measurements announced by Levet, and so often repeated since on his authority, are still more inexact than those of M. Richard, since, according to him, at eight days the embryo measures from five to six lines; then, at fifteen days, an inch; an inch and a half at twenty days, two inches at one month, four inches at two months, six inches at three months, and so on two inches per month up to the full term.

The following, on the other hand, are the characters most usually presented by the foetus externally, at the different phases of its evolution.

SECT. II.—THE FŒTUS.

ART. I.—AGE AND GRADUAL DEVELOPMENT.

The *skin* of the human embryo has no real existence until at a pretty advanced period of its growth, while the sort of circle which it at first constitutes is nothing more than a homogeneous gelatinous substance of slight consistency; the epidermis cannot be distinguished from the skin until after the second month.

At *three months*, the teguments are distinct, but still gelatinous and of a rose color. The eyelids and mouth remain shut, the nose is very projecting, the head very large; the costal arches and bones of the forearm are visible through the transparent substances in which they are enclosed. The fingers and toes are perfectly distinct, and covered on the dorsal surface of their extremities with a reddish plate of the shape of the nail.

At *four months* the skin is much firmer, and at certain points is furnished with adipose granulations. The head begins to be covered with down; the scrotum, or the greater or lesser labia, are formed; the anus is open; and if in the measurement we comprise the lower extremities, which, notwithstanding the common

opinion to the contrary, are as long as the thoracic members, the fœtus will be from five to six inches in length.

At *five months*, a little down and some particles of sebaceous matter are observable upon various portions of the skin; the hairs begin to grow, but are still white, or without any determinate color. The teguments are less transparent, although still of a rose color, and but slightly extensible; the nails are evident; the umbilical cord is far removed from the penis or clitoris. No pupil can be distinguished, and the fœtus is from seven to eight inches long.

At *six months*, the period of *viabilité*, the down and the sebaceous deposit are visible, at least in the axillæ and groins. The hairs of the head may be easily distinguished from those that grow upon other parts of the body; the eyelids are no longer transparent; it has been said that there is at this period no pupil; but it has appeared to me, on the contrary, to be extremely large; the xiphoid cartilage occupies the middle of the great axis of the fœtus, whose whole length is from nine to ten inches.

At *seven months*, the hair is longer, and not so pale; the down and cutaneous *enduit* are more generally diffused; the skin is less colored; the nails are large; the *membrana pupillaris* bursts, according to the authors; but it is by no means certain that this membrane really exists in the manner usually understood; I have reason to think that the iris originates at first as a simple ring, which grows concentrically, so as at least to leave the opening commonly called pupil or apple of the eye. The *navel* is still below the middle of the fœtus; the external genital organs are all apparent, except the testicles in the male, and the fœtus is about twelve inches long.

At *eight months*, the fœtus is only distinguished by its greater maturity; its length is about fifteen inches. Its hair is more or less colored; its skin, covered with sebaceous matter and down, is thick, and not so smooth as before; the lower jaw, which at first was very short, is now almost as long as the upper one, and the nails exhibit a certain degree of consistency.

At *term*.—The development and weight of a well-formed fœtus, at term, are far from being alike in all cases. The knowledge of them, however, even if approximative, is so important in the practice of midwifery, that their extremes and average ought to be sought for with great care. At this period, the length of the occipito-coccygeal diameter is twelve inches; but the average length of a fœtus straightened out and taken from the heel to the vertex, is eighteen inches. Sixteen, seventeen, nineteen, twenty, and even twenty-two inches, are also pretty common measurements; but it is rare to meet with only twelve inches, or to find twenty-three. The instances of children, as in the example cited by Millot, twenty-five, twenty-six, twenty-eight, thirty, and even thirty-six inches in length, or of only ten, eight, or even six inches, which we find in old *scientific collections*, instances which the common people always receive with cordiality, may be boldly classed among other popular stories.

The weight of the fœtus is generally six pounds, frequently six and a half or seven, sometimes eight, and rarely nine or ten. Among four thousand children, born at the Maternité, at Paris, in a given time, Madame Lachapelle never met with one weighing as much as twelve pounds. Baudelocque, who had a case where the child weighed twelve pounds and three-quarters, maintains that it is incredible that a larger one was ever seen; the weight of the child also, according to Chaussier, is frequently only five, four, and sometimes three, or two and a half pounds; but in the latter instances, it seems to me evident that pregnancy had not reached its full term.

Out of the profession, we daily hear of children weighing fifteen, eighteen, twenty, twenty-five, and even thirty pounds at birth. Those stories, too, which may be found in many authors of the sixteenth, seventeenth, and even of the eighteenth century, are owing to the fact that persons who will not take the trouble to weigh

PLATE IV.

THE FŒTUS AND ITS CIRCULATION.

FIG. 1.—THE CHILD AND ITS APPENDAGES AFTER THE REMOVAL OF THE WALLS OF THE CHEST AND ABDOMEN, SO AS TO EXHIBIT THE ORGANS OF CIRCULATION.

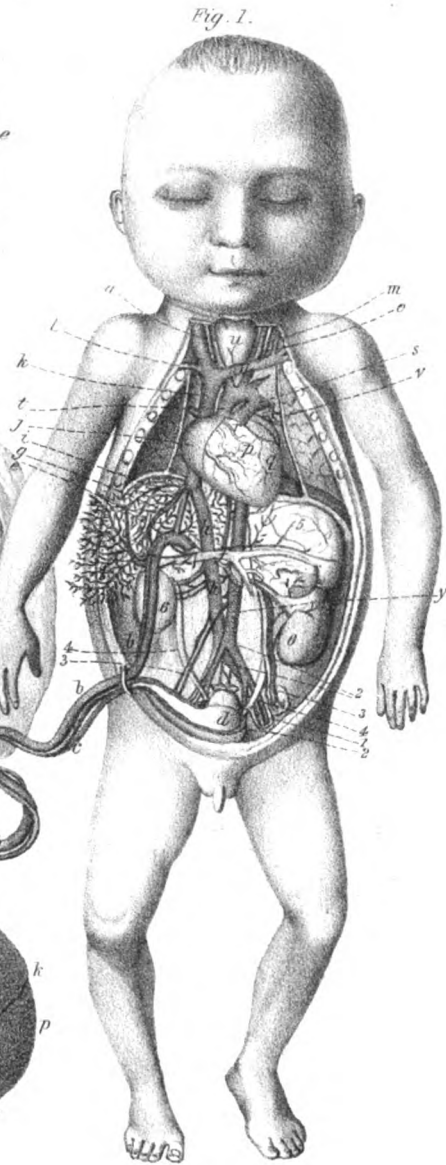
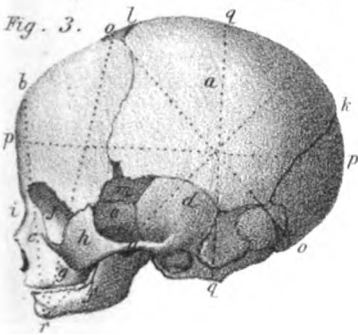
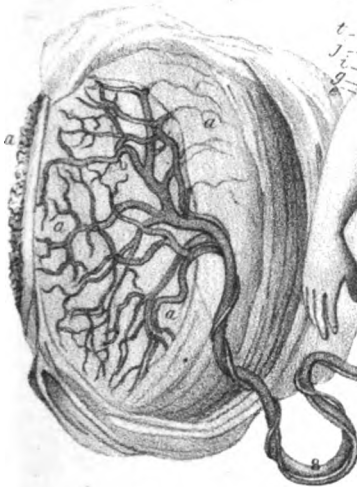
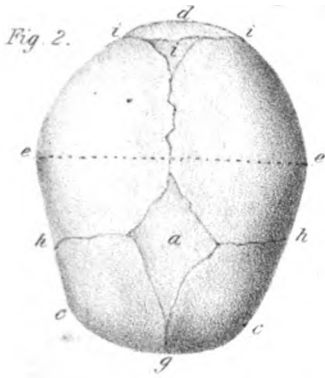
- | | |
|---|--|
| <i>a, a, a.</i> The placenta. | <i>g.</i> The left ventricle. |
| <i>b, b.</i> The umbilical vein. | <i>r.</i> The trunk of the pulmonary artery. |
| <i>c, c.</i> The umbilical arteries. | <i>s.</i> The ductus arteriosus. |
| <i>d.</i> A prolongation of the bladder towards the cord. | <i>t.</i> The arch of the aorta. |
| <i>e.</i> The branch of the umbilical vein, which empties into the vena portarum, <i>f.</i> | <i>u.</i> The thymus gland. |
| <i>g.</i> The ductus venosus. | <i>v.</i> The phrenic nerve. |
| <i>h, h.</i> The inferior vena cava. | <i>x.</i> The right carotid artery, and pneumogastric nerve. |
| <i>i.</i> The hepatic veins. | <i>y.</i> Abdominal aorta. |
| <i>j.</i> The right auricle. | <i>z.</i> Primitive iliac arteries. |
| <i>k.</i> The vena cava ascendens. | 1. External iliac arteries. |
| <i>l.</i> The right subclavian vein. | 2. Internal iliac arteries. |
| <i>m, m.</i> The internal jugular veins. | 3, 3. Vesiculæ seminales. |
| <i>n.</i> The left subclavian vein. | 4, 4. Ureters. |
| <i>o.</i> The left carotid artery and pneumogastric nerve. | 5. Spleen. |
| <i>p.</i> The right ventricle. | 6, 6. Kidneys. |
| | 7, 7, 7. Vascular net-work of the liver. |
| | 8, 8. Umbilical cord. |

FIG. 2.—THE HEAD OF THE FŒTUS AT TERM, SEEN FROM ABOVE.

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|---|--|
| <i>a.</i> Anterior fontanelle or bregma. | <i>f.</i> Parietal portion of the sagittal suture. |
| <i>b.</i> Posterior or occipital fontanelle. | <i>h, h.</i> Coronal suture. |
| <i>c, c.</i> Frontal protuberances. | <i>i, i.</i> Lambdoidal suture. |
| <i>d.</i> Occipital angle. | |
| <i>e, e.</i> Biparietal diameter, and parietal protuberances. | |

FIG. 3.—THE HEAD VIEWED FROM THE SIDE.

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|------------------------------------|--|
| <i>a.</i> Parietal protuberance. | <i>k.</i> Posterior fontanelle. |
| <i>b.</i> Frontal protuberance. | <i>l.</i> Anterior fontanelle. |
| <i>c.</i> Occipital bone. | <i>m.</i> Fontanelle in the lambdoidal suture. |
| <i>d.</i> Temporal bone. | <i>n.</i> Zygomatic arch. |
| <i>e.</i> Sphenoid bone. | <i>o, o.</i> The occipito-bregmatic diameter. |
| <i>f.</i> Inferior maxillary bone. | <i>p, p.</i> The occipito-frontal diameter. |
| <i>g.</i> Superior maxillary bone. | <i>q, q.</i> The trachelo-bregmatic diameter. |
| <i>h.</i> Malar bone. | <i>r, o.</i> Mento-bregmatic diameter. |
| <i>i.</i> Nasal bone. | |
| <i>j.</i> The orbit. | |



such children, very easily attribute a weight of twelve or fifteen pounds to children that actually weigh only seven or eight. In fact, a new-born child of eight or nine pounds is enormous. The persons surrounding the lying-in woman, when they see such an one, rarely fail to cry out that it is a child of twelve or fifteen pounds; and it is very likely that, in order to render the fact still more curious, four or five pounds will be added to its weight after the fifth or sixth repetition of the story. It is thus that Millot states that the child, in the case reported by him, weighed fifteen pounds. There are also errors in the statement of Hagen, who says that the child mentioned by Voigtel weighed sixteen pounds, and in that of Sander, who says that in two families all the children weighed fifteen pounds. In order to reduce such fables, which are founded upon gross errors of observation, to their real value, it is only necessary to reflect that thirty pounds is the weight of children of from two to three years of age.* Levret, who accords to the child but seven or eight pounds, instead of eleven or twelve, as Mauriceau does, goes certainly a little too far; but it seems to me that Chaussier fell a little below the truth, and that six or seven pounds is the weight most usually observed.

If the absolute length of the fœtus is subject to such great varieties, it is easy to conceive that the relative length of different parts of it cannot be more precise and determinate. Nevertheless, we are sometimes obliged in medical jurisprudence to have recourse to it in order to determine the age of a given fœtus. According to Chaussier, taking eighteen inches as a mean term, there are ten inches and four lines from the vertex to the navel, and seven inches and eight lines from the navel to the sole of the foot; eleven inches and nine lines from the pubis to the vertex; six inches and three lines from the pubis to the sole of the foot; two inches and three lines from the clavicle to the lower end of the sternum, and six inches from the extremity of the sternum to the pubis. From the top of one acromion to the other we find four inches and a half, which may be easily reduced to three inches and a half by squeezing the shoulders together. The greatest antero-posterior thickness of the thorax is four inches and a half, while there are only three inches from one crista of the ilium to the other.

ART. II.—OF THE FŒTAL HEAD AT TERM.

The head, being of all parts of the fœtus the largest and most incompressible, ought to be studied with the most particular care. The bones of which it is composed, its articulations, its diameters, its motions, and the degree of reduction it is susceptible of, ought to be perfectly known to the practitioner who desires not to be more dangerous than useful in applying the assistance of the art to cases of dystocia. It is composed, as in the adult, of the cranium, which is its most interesting part, and of the face, which is as yet but little developed.

§ 1. BONES OF THE CRANIUM.

In the fœtus at term, the eight bones of the skull, the *frontal*, *occipital*, the *two parietal*, the *two temporal*, the *sphenoid*, and *ethmoid* bones are far from possessing the same firmness as those of the adult; those of the vault are still quite flexible, and separated from each other by membranous spaces of greater or less size; the frontal is formed of two symmetrical pieces; the thin or flattened portion of the occipital and the squamous portion of the temporal are pretty fre-

* Nevertheless, I beg leave to affirm that new-born children weighing ten pounds are by no means rare in the United States. I have weighed many of eleven and a half pounds, and several of twelve pounds. A few years since, a lady in this city gave birth to a child of thirteen and a half pounds, carefully weighed by me. She died a few days afterwards with puerperal fever. I have already noted a case of twins the sum of whose weight was sixteen and a-half pounds.—M.

quently separate from the petrous and condyloid portions respectively; the basilar apophysis, the body of the sphenoid, the petrous portion of the temporal, and the several pieces which constitute the base of the cranium, are, on the contrary, almost completely ossified, or at least form with the cartilages which unite them an incompressible mass.

§ 2. SUTURES.

The *sutures* of the foetal cranium are more numerous, more movable, and wider than those of the adult. As they, together with the fontanelles, serve to mark the positions of the head, it is very important for the accoucheur to have them always present to his memory.

The *sagittal*, straight, or antero-posterior suture extends from the root of the nose to the superior angle of the occipital bone, and may be divided into two portions, the *naso-parietal*, which unites the two pieces of the frontal bone, and the *parietal* portion, which is formed by the conjunction of the two parietal bones at their superior edges. The *fronto-parietal*, coronal, transverse or anterior suture crosses the one above mentioned at right angles, at the place where its two halves unite. The *occipito-parietal*, lambdoidal, posterior, or occipital suture seems to be only a bifurcation of the sagittal. As the squamous, or temporo-parietal sutures are concealed under a thick layer of soft parts, they hardly deserve to be mentioned in a work on midwifery.

The *lambdoidal* suture, so called from its resemblance to the Greek Λ , is perhaps the most frequent cause of error, as it may be mistaken for the fronto-parietal. It differs from it, however, because its two branches, which are oblique to each other and to the sagittal suture, really form two distinct and independent sutures, while the two moieties of the anterior suture are only continuations of each other, and constitute but one and the same line.

§ 3. FONTANELLES.

There are usually found, at the points where these sutures cross or terminate, certain membranous spaces called fontanelles or fountains of the brain.

The *anterior* or frontal fontanelle, which is sometimes called the bregmatic fontanelle, because it in fact answers to the *bregma*, forms the common point of union of four bony angles, viz., the superior angles of two portions of the frontal bones, and the two antero-superior angles of the parietal bones. It is larger or smaller according as these angles are sharper or rounder. It is of a lozenge shape, and generally extends much farther between the two portions of the coronal than of the parietal bones.

The *posterior*, or occipital fontanelle, which forms a part of the summit of the head, is situated at the spot where the sagittal loses itself in the lambdoidal suture; it is always very narrow, and in some subjects is scarcely distinguishable; its triangular shape prevents it from being mistaken for the one before mentioned; but, as a middle suture sometimes divides the occipital bone into two pieces, and as the superior angle of this bone is sometimes wanting, it must be remembered that only three branches issue from this fontanelle, or, if there should be four, the two lateral branches proceed obliquely towards the mastoid processes, and do not cross the other at right angles, as is the case at the anterior fontanelle. This is the most important fontanelle, since it indicates the presence of the summit of the head.

The *inferior* or lateral fontanelles, four in number, two on each side, are found at the points of termination of the anterior and posterior sutures, and are of no use in the practice of midwifery.

There may also exist in the cranium accidental separations, which may be mistaken for a fontanelle. A foetus which was delivered with the forceps, and which I afterwards examined with M. Malgaigne, had in the middle of the fronto-

nasal suture a space eight lines wide and ten long, entirely deprived of bone. The fascia, the integuments, and the dura mater presented nothing peculiar. The bony margin was rendered solid, thick, and the whole resembled perfectly a fontanelle. We may also conceive that a great part, and even that almost the whole of the bony vault of the cranium, may be deficient, as the observations of Mauriceau prove.

§ 4. REGIONS.

The head is further divided into five *regions* or *ovals*: one superior, in which are to be observed the summit behind, the bregma and sinciput in front, the vertex in the middle, and which is bounded below by the occipito-frontal circumference; another, inferior, which is represented by the base of the cranium and posterior part of the face; a third, anterior or facial, which is inclosed in the fronto-mental circumference; the last two, lateral or temporal, which comprise whatever is left out by the others, and whose dimensions have reference, in labor, to those of the occipito-mental diameter, which renders presentations of them highly disadvantageous.

§ 5. FORM.

The head of the fœtus, chiefly remarkable from the flexibility of its vault, exhibits in its *ensemble* the form of an oval, the attitude of which has occasioned a sort of literary quarrel between MM. Capuron and Van Solingen: the former of these authors insists that the large extremity of the head is turned backwards, while the latter, who is also followed by M. Dugès, places it, on the contrary, in front. If the external occipital protuberance occupies the centre of the strait in labor, it is difficult not to agree, with the Dutch accoucheur, that the large extremity of the oval is represented by the face; but when we take hold of the head by the chin, its large extremity is undoubtedly to be found posteriorly. In this case, as in many others, the dispute is rather about words than things; both sides are right, and both are wrong in some respects. However, by reflecting that all the diameters of the posterior part of the head are three inches and a half in length, while the longest of those of the face is only three inches at most, it will be evident that we ought to adopt the opinion of our countryman, and say that the large extremity of the foetal head is formed by the occiput.

§ 6. DIAMETERS.

The axes or diameters of the head are imaginary lines, which pass through it in determinate directions. They may be multiplied *ad infinitum*; but those only that are liable to be placed in certain relations to the axes or diameters of the pelvis deserve our attention. I think that it is sufficient to describe seven:—

1. The *occipito-mental*, five inches in length, extending from the most projecting part of the occiput to the point of the chin, also called the great or oblique diameter, and which M. Flamant denominates the *sur-occipito-mental*, is the longest.

2. The *occipito-frontal*, about four inches long, which extends from the occipital protuberance to the forehead, and which is also called the straight or antero-posterior diameter.

3. The *bi-parietal*, or transverse diameter, reaching from one parietal protuberance to the other, and which is three inches and a half.

4. The *bi-temporal*, or smallest diameter, measured from the root of one zygomatic apophysis to the opposite one, and whose length is two inches and a half.

5. The *vertical* or *trachelo-bregmatic*, which passes through the head perpendicularly, descending from the vertex to the anterior part of the occipital foramen, and is about three inches and a half.

6. The *fronto-mental*, or facial, whose name sufficiently indicates its situation, and whose extent is three inches.

7. Finally, the *occipito-bregmatic*, the most important of all, whose posterior extremity is situated between the occipital protuberance and foramen magnum, and proceeds to terminate at the anterior fontanelle; its length is nearly three inches and three-quarters.

Smellie gives to the head three inches and a half from one ear to the other, and four inches and a half from the forehead to the occiput; but this fact is explained by the difference of the English measure. In saying that the great diameter extends from the chin to the bregma, Levret is evidently mistaken; P. Francois is also wrong in thinking that, if the bi-parietal diameter is three and a half inches, the bi-temporal should be three inches, or three inches and two lines. In truth, Burns is mistaken also, if he uses the English measure, in giving only from three inches and a quarter to three inches and a half to the line which separates the two parietal protuberances.

§ 7. CIRCUMFERENCES.

These various diameters are accompanied with an equal number of circumferences, which should receive the same names, and whose lengths are equally various:—

1. The *occipito-mental*, or great circumference, which divides the head into two lateral halves, exactly similar to each other, passes at the same time over both extremities of the occipito-mental diameter, and which, when multiplied by three, equals the length of the circumference, and also over those of the fronto-mental, occipito-frontal, vertical, and occipito-bregmatic.

2. The *facial* circumference, which passes over the forehead, the chin, and the cheeks.

3. The circumference of the *vertical diameter*, which passes a little in front of the parietal protuberances, and thus divides the head transversely.

4. That of the *occipito-frontal* diameter, which at the same time embraces the extremes of the transverse diameter, and separates, horizontally, the vault from the base of the cranium.

5. That of the *occipito-bregmatic* axis, which is also the special circumference of the bi-parietal diameter, and the most important of all, for in all natural labors it is found in relation with the circle of the pelvic straits.

6. Finally, the circumference of the *bi-temporal* or smallest diameter should pass also over both ends of the vertical or occipito-bregmatic; its existence ought not to be admitted except in the greatest possible degree of reduction of the head; a knowledge of it then becomes of the highest practical interest, for, by comparing its line of tension, that is to say, its bi-temporal axis with the vitiated diameters of the pelvis, through which the child has to pass, we can ascertain whether delivery will be practicable or not.

§ 8. VARIETIES.

These measurements are susceptible of various degrees of reduction or elongation, whether by means merely of the uterine contractions, or by the mechanical action of the instruments that are sometimes employed in midwifery. Thus, the occipito-frontal diameter, when compressed at its extremities, may be shortened several lines, by the over-riding of the corresponding edges of the frontal, parietal, and occipital bones. The same is true of the transverse and occipito-bregmatic axis, whenever the pressure bears chiefly on the two opposite points of their circumference.

From the above arrangement it follows: 1. That the diameters of the vault of the cranium alone are reducible in labor; 2. That, whenever the diameters of the pelvis are smaller than those of the base of the foetal skull, delivery is physically

impossible without the aid of art; 3. That in this way the medulla oblongata, the pons Varolii, the tubercula quadrigemina, and the peduncles of the cerebrum and cerebellum, are completely protected, while the cerebral and cerebellar lobes, which are almost unconnected with the maintenance of the vegetative life of the fœtus, are alone liable to be slightly compressed.

§ 9. CEPHALOMETRY.

The numberless varieties of which the dimensions of the head are susceptible have long since convinced accoucheurs of the necessity of discovering some means by which to ascertain what they are in the fœtus while still contained within the maternal organs; but it must be confessed, notwithstanding M. Flamant's opinion, that all attempts of the sort have been hitherto fruitless. But, while I release the reader from a tedious description, or even enumeration, of all the different methods that have been proposed at various periods, it seems indispensably necessary for me to say a few words on the researches of one of my former fellow-students upon this subject.

By measuring a certain number of dried heads, M. Foulhioux ascertained, 1. That a line drawn from the fronto-nasal suture to the edge of the upper alveoli, represents, very nearly, one-half of another line, drawn from the superior angle to the great foramen of the occipital bone; 2. That the space between the fronto-nasal and fronto-parietal sutures is equal to that which extends from the posterior edge of the coronal, and the point of the occipital; 3. That by adding five or six lines to the occipital arch, we obtain the length of the sagittal suture; 4. That the bi-parietal diameter is six lines longer than the sagittal suture; 5. That the facial line multiplied by three also gives the length of the transverse diameter; 6. That the occipito-frontal diameter exceeds the bi-parietal by nine lines. So that, if we can succeed during labor in measuring, with any degree of precision, either the fronto-maxillary line, or the naso-parietal arch, or the occipital arch, or, lastly, the sagittal suture, it is afterwards easy to determine the antero-posterior and transverse diameters of the cranium.

The assertions of M. Foulhioux, subjected to pretty numerous experimental tests, have appeared to me to be, in general, correct; but I have also found that the proportional differences which he endeavors to establish are too variable to admit of their being very usefully employed in practice. Even were they to prove constantly and rigorously correct, how shall we ever be able to distinguish through the soft parts, and within the maternal organs, the precise length of the occipital arch, or the frontal arch, or even the facial line? The thing appears to me to be impossible.

Besides, it is well to remark, with MM. Clark, Burns, and Ryan, that the head of boys is from a twenty-eighth to a thirtieth larger than that of girls; which, according to Bland, accounts for the fact that, all other things being equal, more boys than girls die during labor.

§ 10. ARTICULATION.

The articulation of the head with the vertebral column merits the most serious attention; for want of a careful study of it, a vast number of accoucheurs and midwives bring children still-born into the world, who, a few minutes before, were strong and full of vigor.

The union of the atlas with the occipital bone is a very close articulation, which scarcely admits of any motion except flexion and extension; that of the atlas with the axis is a rotatory ginglymus, so arranged that, if the pivot motion of the head is carried beyond a quarter of a circle, the articular surfaces immediately separate, and the spinal marrow is at the same moment compressed, torn, or even entirely broken off; so that, if the chin of the fœtus turns so far as to pass behind the point of the shoulder, death ensues immediately. On the other

hand, it is in the occipito-vertebral articulation that we find the cause of the so frequent presentations of the vertex rather than the face. In fact, when seen in an antero-posterior direction, the head, resting on the top of the spine, represents a lever of the third kind: during the efforts of parturition, the power being evidently represented by the vertebral column, the points of rest and of resistance must necessarily be met with at the extremities of the occipito-mental diameter. Now, if the occiput almost always descends first, while the chin descends but very rarely, it depends upon the more advantageous action of the power upon the occipital rather than upon the opposite extremity of this lever, the condyles being nearer the former than the latter of these points.

ART. III.—OF THE ATTITUDE AND POSITION OF THE FŒTUS.

§ 1. During the whole course of pregnancy, the fœtus is bent forwards, so as to

Fig. 19.



The usual position of the child in the womb.

form a kind of circle, more or less complete; at full term, it is found with the head bent forwards on the breast, the feet turned up to the front part of the legs, the legs against the hind part of the thighs, the thighs on the anterior surface of the abdomen, the heels crossed and very near the ischia, the arms applied to the sides of the thorax, the forearms bent, and crossed in front of the sternum, as if to support the chin betwixt the two hands. It, therefore, forms an oval mass, whose large end is represented by the pelvic extremity of the trunk, and its apex by the cephalic extremity. In this state its great or *occipito-coccygeal* diameter is only ten or twelve inches in length, and may even be shortened one or two inches by pressure exerted upon its two extremities.

§ 2. It may be affirmed, in general, that the laws of gravity determine the position of the fœtus, until the last stage of gestation; suspended in the centre of the ovum by means of the umbilical cord,* loose and very movable in the amniotic liquor, it necessarily falls to the lowest point of the cavity in which it is contained; the cord being inserted much nearer to the coccyx than to the occiput, renders it necessary for the cephalic extremity of the fœtus to fall to the lowest part of the womb: therefore, since, even when the woman is lying down, the neck is lower than the fundus of the womb, it is clear that the head must naturally be turned towards the superior strait in a great majority of cases, as is proved by daily experience, and which M. Termonini especially undertakes to prove. Founded on the opinion of Aristotle, many authors formerly admitted this hypothesis. But in the sixteenth and seventeenth centuries it was attempted to ascribe the cause of this phenomenon to the will of the fœtus. Smelling the air, as Paré says, the child forces itself out head foremost. Mauriceau says that it turns the head downwards, so that it may be the better disposed to escape. The moderns

* It is hardly correct to say that the fœtus is suspended, &c., by means of the umbilical cord; that cord is twenty inches in length; and as the whole length of the womb is only twelve inches, it follows that the child is not *suspended* by the cord. It is *connected* with its parent by it.—M.

had returned to the opinions of the ancients, and the question seemed to have been definitely determined, when M. Dubois reproduced the doctrine of the Middle Ages before the Academy of Medicine. Many experiments induced him to conclude that it is instinct, and not gravity, which brings the head towards the external orifice. On placing still-born infants in a bath, he found that the buttocks or the back turned as often towards the bottom as the head did. Dead children, those which are not viable, and monsters, being deprived of instinct, come less often by the head than those which are living and well formed. It is to instinct also that we must ascribe the fact that the head of animals always comes first, when we understand that the laws of gravity should have produced an entirely opposite effect.

To these arguments we may object that the conditions indicated by M. Dubois differ widely from those which belong to the pregnant woman. In the womb, the fœtus occupies an oval cavity, all the planes of which converge and tend to conduct towards the neck the most regular and solid portion of the body which it contains. The orifice is the most dependent point, not only in the erect position, but also in the recumbent. Jumping, walking, all the movements of the woman, and even those of the fœtus, oblige it to descend rather by the head than by the breech. Indeed, as the cord does not hold it suspended towards the close of pregnancy, it has no influence on its moving about. If the spontaneous movement of the fœtus places it otherwise, it would now resume its original position when in repose. The lesser frequency of the cephalic presentations, when the fœtus is dead or monstrous, and in cases of abortion, is explained by the softness, the small volume, and the irregularity of the parts, and favors instead of destroying the old hypothesis. In brutes, the arrangement of the mother's organs, and the relative weight of the different parts of the young, add also strength to this opinion, and do not render necessary the influence of the instinct. I persist then in believing that the weight, and the anatomical relations of the mother and fœtus, are the causes which carry the head towards the straits of the pelvis.

§ 3. But the ancients entertained a different opinion. According to Hippocrates and Galen, the fœtus has its head upwards, the pelvic extremity turned towards the margin of the pelvis, and the hinder part of the breech resting against the sacro-vertebral angle, until about the seventh month. Then, by means of certain quick and somewhat convulsive motions, according to Arantius, it turns over, performing a somerset; so that the forehead comes to take the place of the breech, and *vice versa*. This hypothesis, generally adopted in France until the time of Baudelocque, and since that period still defended by several authors, principally in Germany, is now abandoned to the vulgar, who also are beginning to give it up. It has also met with opposition at many periods of the science. Varon did not admit it; Columbus also rejected it; Aristotle had already stated that in animals the young presented by the head throughout the whole of gestation. De la Motte maintains that the fœtus has no fixed position, and that it does not make a somerset rather at the seventh than at the fifth, sixth, eighth, or ninth month. Smellie speaks in the same way. Yet Levret, paying no regard to the arguments of De la Motte, does not hesitate to affirm that he has proofs of the occurrence of this somerset. Ould and Burton believe that it takes place only at the moment of labor; while, according to Roederer, it is accomplished by degrees in proportion as the head increases. I would add that Girard, of Lyons, has not thought it beneath him to plead still in favor of this pretended movement, when endeavoring, at the present day, to prove that the fœtus is at first placed crosswise, and that it only changes its position after the sixth month.

If a pregnant woman dies before the seventh month of gestation, the head of the fœtus is found turned towards the neck of the uterus, just as it is at the full term. I have opened the bodies of three women who died between the third

and sixth months of their pregnancy, and in these three cases the occiput was below. Who has not seen the fœtus come head foremost in abortion as at the full period? From October, 1823, to the month of April, 1826, eight miscarriages of from four to seven months, took place under my care at the *Hospital de Perfectionnement*; I have observed nearly the same number in my private practice, and at my public lying-in ward: but in all these cases I found the breech presenting in only two instances. Further, it is not uncommon to find the neck sufficiently softened before the seventh month to permit the finger to pass in so as to touch the naked ovum in the womb, and we almost always find that the head is downwards. Another reason, advanced by the moderns, as decisive, but which, if taken singly, would not appear to me to be very conclusive, is derived from the length of the fœtus, compared with the dimensions of the uterine cavity. It has been said, since the fœtus after the sixth month is from ten to twelve inches long, it is physically impossible for it to turn after that period in the cavity of the womb, whose transverse and antero-posterior diameters do not exceed six or eight inches. No doubt; but they forget that the fœtus is doubled up in the amnios, and instead of twelve, its long diameter is only six or eight inches; they also forget that even at full term the child sometimes changes its position during labor, and that, even at the period of its greatest development, the diameter, passing from its occiput to the coccyx, does not always exceed the length of the horizontal diameter of the womb.

It is not, therefore, correct to maintain that the proportional dimensions of the uterus and fœtus raise an insurmountable barrier to the somerset motion. If this transposition has no existence, it is because the relative weight of the head and mechanical laws render it unnecessary. The proportional quantity of water being the greater as the pregnancy is less advanced, it can be readily understood that the fœtus becomes less and less movable, and that it cannot turn quickly after the seventh month, as it does sometimes before, and especially about this time, which peculiarity has doubtless deceived both the accoucheur and the female.

CHAPTER II.

COMPOUND PREGNANCY.

As a general rule, a woman bears but one child; but it sometimes happens, and as an exception, that she may bring forth two or even a greater number. Double pregnancies are quite frequent, according to the *résumé* by Burns. There was 1 in 58 at the Dublin Hospital, 1 in 91 at the Bristol Lying-in Hospital, 1 in 80 at the Westminster Hospital, and 1 in 95 in his private practice. Mërriman says, according to Clarke, that the average in Dublin is 1 in 56½, and 1 in 90 in Vienna, according to Boer. Madame Boivin gives 1 in 132, and Tenon gives 1 in 96. In 6583 deliveries at the Birmingham Dispensary, from 1820 to 1830, Ingleby observed 85 cases of twins, and the statistics of the Maternité, at Paris, give 444 in 37,441. Without being so common, triplets are not so very rare. Dionis relates three examples, and among them that of M. d'Arnoton, who, being at play, and not wishing to leave the party, said, when his servant came to announce the birth of the first, then of the second, and then of the third child, of which the countess had just been delivered: "Ah! it is necessary for me to go, for there is no reason why a stop should not be put to this." Mauriceau and De la Motte have also met with them. M. Miglietta cites two cases. M. Esquirol and M. Forget have each had one case in Paris within a short time. Saviard said that he saw one case in June, 1687, and another in September, 1688, at the Hôtel Dieu, and remarked that the ovum contained three cords and but one placenta. Out of 37,441 deliveries, noted during a determinate period at the Maternité, there were but five. I have only seen a single example, and Denman says that he has met with but one during a practice of thirty years. Sussmilch has already established the fact that twins occur once in seventy times, and Blumenbach says that they are very rare in Greenland, while in Ireland the majority of conceptions are double.

Furthermore, nothing is more variable than the occurrence of triplets. Thus, in ten years, the Birmingham Dispensary presented no example in a mass of 6,583 deliveries; while it is shown that in the city there occurred three in less than six months, and that Mr. Ingleby met with a fourth in his private practice.

We perceive already that a quadruple pregnancy should be a rarity. It is, however, not possible to call it in question. Aristotle, who says that twins are common in Egypt, has met with an example. Viardel has also seen four embryos in a recent ovum. Mauriceau instances the bricklayer Hébert, who, complimented on his four infants, whilst in the saloon of a noble family, replied that, if his foot had not slipped, he would have made a half dozen. On his own authority, M. Miglietta assures us that Gorgani, Lombardi, and Constantini have each met with a case, and that he himself saw one in Naples in 1801. In the case related by Hamilton, the four fetuses were expelled between the sixth and seventh month; three of them were living. It is, however, a rare occurrence, for in the mass of 108,000 accouchements noted both at the Hôtel Dieu and at the Maternité, at Paris, it did not take place once from 1761 to 1820.

This is not, however, the extreme limit to which a woman may attain. Five children have been met with in the womb. This cannot be denied at the present

day. Aristotle believed it so fully that he relates the history of a woman who had had four and twenty such deliveries. Peu assures us that five living children were born at the Hôtel Dieu from a single pregnancy. Lauerjat also gives an example. We find another in the *Edinb. New Phil. Journal*; and all the periodicals of the day have mentioned the case which M. Weiss has given of a woman who had had a double pregnancy five years before.

M. Galding has gone still farther, since he speaks of the delivery of seven children, of which one was at full term, two at about seven months, and four at about three months. So soon as we admit the occurrence of five fetuses in one pregnancy, we cannot refuse to the organism the possibility of producing six or even seven; but, indeed, such facts seem to be so extraordinary that, to be received into the science, they should require a degree of authenticity which is wanting in most of them. We can scarcely then range among fables the famous history of the nine *pourcelets* who were born from a single pregnancy, and who were, nevertheless, all great men; or that of the Portuguese woman, who, from the 8th of February to the 3d of May, brought into the world nine children; or that which Saignette has published of another woman who had twelve at a single birth. We can also understand how Albert has been able to speak of a pregnancy of twenty-two and even of seventy children, since Schenk is not afraid of appearing ridiculous when relating that, in 1276, a certain Marguerite, Countess de Hollande, had had a delivery of three hundred and sixty-five, as the consequence of the imprecation of a beggar!

It would wear out the patience of the reader to discuss the causes or conditions of multiple pregnancies. We can only say that some individuals possess an extraordinary fecundity, which is sometimes on the side of the woman, and sometimes on that of the man. Supposing that the history of the Russian Wasilief, the first wife of whom had four deliveries of four children each, seven of three, and sixteen of two, and whose second wife had also two pregnancies of three fetuses, and six of two, so that he had eighty-four living children out of eighty-five which he had begotten, is nothing more than the invention of the English trader who related it, it is at least certain that we often observe multiple pregnancies many times in the same woman, or proceeding from the same man.

If the fetuses are carried to the full period of gestation, they are almost always smaller than in an ordinary pregnancy. Twins have also much less chance of living than a single child. Triplets are sometimes born alive, as is demonstrated by the two cases published by M.M. Esquirol and Forget, but it is very seldom that they do not die soon after. It is the same, and with stronger reason, with quadruplets. The five children spoken of by M. Weiss died within the first three days.

Most frequently they are not carried to full term. One of them dying may bring on the abortion of the entire ovum, or it may be expelled alone, and the pregnancy may subsequently go on naturally, as in the case reported by M. de Meza. Frequently, also, it remains in its envelop, altering more or less, and is discharged with the other at its birth. It may become monstrous before ceasing to live and become united to the other, or it may continue independent. It is to these peculiarities that most of the histories of superfetation are due, of which I will speak hereafter. The most remarkable thing is that the dead fetus should preserve most frequently a great part of its natural characters, after remaining for many months in the womb. Mauriceau has seen one of about four months escape along with the fetus at term, and still living. In one of Pue's cases, of not more than four months, it was wrinkled and withered. Burton cites two cases nearly parallel. It was not expelled until the fifth day after the accouchement, in the case reported by Campbell. In Alfou's case, it was found enveloped in the placenta of the full-grown child, having its head flattened out, and with

the appearance of a fœtus of from four to five months. That of M. Sultzer, also of from four to five months, was flattened out and in part adherent to the membranes. M. Pezerat describes his as of from four to five months, remarking, at the same time, that the other was living and at term. The fetus was also of five months, in the case given by M. Marie. That of Fichet of Flechy was a little decayed, and only three months old. Désormeaux speaks of one of about six and a half months, in a woman delivered fifteen days before the natural term of a living child. M. Moreau says that, on four occasions, he has met with an embryo of three or four months with a fœtus at term. M. Mesnard has collected three similar facts, and many other practitioners have done the same. In a case of triplets reported by Portal, one of the children was alive, while the other two were flattened out and withered.

It sometimes happens, however, that the dead fœtus is more or less destroyed. One of those spoken of by Peu was half rotten when delivered. Smellie cites one which came away piecemeal at six months. It was also putrid in Pinart's case, and very much altered in Chapman's. As to the membranes and placenta, they are always more or less atrophied. Peu states that in one of his cases the placenta was livid and greenish, while in the other it preserved its natural color. We see, in the remarks of M. Cruveilhier, that the placenta of the dead fœtus was very much altered in the two cases which had been presented to the Société Anatomique. I have collected myself two similar specimens.

In fine, we remark that, in multiple pregnancies the children are often of the same sex, it is not at all rare to find them of different sexes. In the case of M. Weiss, there were three boys and two girls. In that of M. Forget, there were two girls and one boy; and M. Caffé says that, in the case of twins which fell under his notice, there was a girl and a boy.

CHAPTER III.

OF SUPERFETATION.

THE name of superfetation is given to the vivification of a germ, in a woman who already contains a fecundated ovule in some part of her generative system.

The existence and the possibility of this fact, admitted and denied by turns by the physicians of all ages, constitute a question upon which modern naturalists have not as yet decided. The ancients have handled it so lightly that it is really useless to oppose them. According to Aristotle, "cases of superfetation have been seen in women, and twelve fetuses have been seen to come away in a single miscarriage in this manner. When the two fetuses have been produced soon after each other, they are born as if they had been twins, as the poets tell us of Iphicles and Hercules." This philosopher also cites, as an instance of superfetation, a woman who brought into the world two children, one resembling her husband and the other her lover!

Almost all the cases we have of superfetation seem to me to be referable, 1. To twin pregnancies, in which one of the children, having died long before the full term, has been preserved within the membranes, not to be expelled until the other, which continued to live; 2. To pregnancies of twins unequally developed, or born at different periods; 3. To cases of extra-uterine pregnancy, which did not interfere with natural gestation; 4. Lastly, to cases of double uterus.

§ 1. DEATH OF ONE FŒTUS BEFORE FULL TERM.

Nothing is more common than to see, in compound pregnancy, one of the fetuses lose its life, and when born exhibit the appearances of a fetus of from two to six months, although in fact it is nine months old, and everybody knows that most monsters are met with in company with a well-formed fetus.

A lady of La Varenne, near Tours, was brought to bed of a stout boy in 1819; with the after-birth, M. Mignot, her surgeon, received another fetus enclosed within the same ovum, but without a head, neck, or arms.

A lady of the Faubourg Saint-Germain was delivered, in 1824, of a vigorous and very stout child; Madame Forbet, the midwife, brought me the after-birth, and at some distance from the umbilical cord I found, supported by a pedicle two inches in length, a fleshy mass, in which were the evident remains of a fetus. In March, 1827, M. Baroilhet had the kindness to give me a monstrous product, which possessed neither head nor members, and which was expelled together with a healthy fetus.

In 1824, at the Hospital de *Perfectionnement*, I delivered, at the same time with a full-grown fetus, a dead one, which as to development had not passed beyond the third month. M. Defermont has shown me a similar specimen. In the month of October, 1826, Madame Badinier, a midwife, brought me two fetuses, one of which, quite deformed, appeared to be of about two months, and the other of five or six; they had both escaped from the same ovum, and before the full term. Bauhin speaks of a woman who gave birth on the same day to a fetus at term, and to an embryo as long as the finger, both enclosed in a single envelop. Ruysch saw the wife of a surgeon of Amsterdam delivered, with an interval of

two hours, of one child, full of life, and of an embryo which could not have been of more than three months' growth, with its cord full of hydatids. Percy speaks of a woman who, after giving birth to a small but lively boy, brought forth a female foetus of the fourth month, in a *pretty good state of preservation*, surrounded by a black, fungous mass. Laurette, says Zacchius, was delivered, eight months after the death of her husband, of a badly-formed male child, which never gave any signs of life. One month and one or two days after this, she was delivered of a second child, which was in good health, and which lived.

Authors conclude that these were cases of superfetation !

§ 2. UNEQUAL DEVELOPMENT OF TWINS.

When two foetuses are contained within the uterus, *one may grow more rapidly* than the other ; one may be expelled before its full time, and the other may not be born till some time afterwards, &c.

To this class belongs, if, indeed, there be not a good many belonging to the same category, the case of a lady named Dupuis, at Saint-Germain-en-Laye, who had a miscarriage at four months and a half, and four months after that brought a healthy boy into the world ; the case which MM. Desgranges and Fodéré look upon as decisive, and in which B. Franquet was delivered of a healthy foetus five months and sixteen days after she had miscarried of a seven months' pregnancy ; the case of Madame Bigaud, who, on the 30th of April, 1748, brought forth a living male child, and notwithstanding that, was delivered on the 17th of the following September of a second foetus, quite as strong and lively ; another communicated by M. Rexain, in which one of the children was born three months after the other ; and those of M. Delmas of Rouen, of M. Pignot of Issoudun, of M. Wendt of Breslau, of Dr. Fahrenhorst, &c.

The two cases by B. Franquet and Madame Bigaud ; the one mentioned in the *Recueil de la Société de Médecine*, in which it is stated that a woman at Arles was delivered of a full-grown child in 1796, and of another, also at full term, in five months afterwards, in 1797 ; another by Dr. Stearns, in which a negro woman was delivered of a *black* child in about the eighth month, and a few hours afterwards of a white foetus of about four months, which exhibited signs of life, are beyond dispute the most difficult to understand. But, as it is not impossible that they might at Lyons have supposed a foetus to be seven months when in fact it was not more than five months old, while the one last born might have exceeded the ninth month of gestation ; and as they might have made the same mistake at Strasburg ; and as the signatures of notaries do not constitute evidence in such cases, we may be permitted to suspect that some error has crept into these stories. Mr. Norton, who speaks of one foetus of eight months which was born dead and of another of four months, which was born alive on the next day, has also committed some error. In the case of M. Wendt, which was repeated three times in the same woman, the child which was born first died soon after, and the second continued to live ; but M. Carus says that the first was not at term, and M. Rudolphi thinks there must have been a double uterus.

§ 3. EXTRA-UTERINE CONCEPTION.

When an *extra-uterine conception* takes place, the womb sometimes swells and becomes filled with concremental matter, as in an ordinary conception ; in such a case, superfetation appears to be impossible : but, if the womb remains in the same state as before fecundation, it is clear that a new conception may take place during the existence of the first gestation. In support of these assertions, I may refer to an instance of extra-uterine pregnancy which lasted for three years, during which time the woman conceived and brought forth a well-formed child ; and another case, for which we are indebted to M. Clien, in which it is said that, in

a woman who died suddenly, one foetus was found behind the womb in the excavation of the pelvis, and another in the cavity of the womb itself.

§ 4. DOUBLE UTERUS.

When the *womb is divided into two cavities* by a perpendicular septum, and these cavities open separately into the vagina, it is evident that two germs may be fecundated at intervals more or less remote; in a word, that superfetation may take place. This is the way in which the following fact ought to be understood which has been cited by M. Cassan, and reported by Madame Boivin. A woman forty years of age was delivered of a little girl on the 15th of March, 1810; *the cavity of the uterus, which was already contracted, was examined without anything being found in it*; and yet this woman, whose abdomen had remained pretty large, gave birth to another child on the 12th of May of the same year.

§ 5. SUPERFETATION, PROPERLY SPEAKING.

We ought also to admit the existence, or at least the possibility of another kind of superfetation. A woman at Charleston gave birth on the same day to twin children, one of which was black and the other white, and accounted for it by stating that, after leaving the arms of her husband in the morning, one of his negroes, armed with a pistol, came and compelled her to have connection with him. A negro woman at Guadaloupe brought forth two full-sized boys, one a black and the other a mulatto, and confessed she had had connection on the same evening with a negro and a white man. Another negro woman had three children at a birth; one black, one white, and a third, a *cabre*. A white servant girl in Montgomery county brought into the world, at the same lying-in, a white girl and a boy that was perfectly black. A negro and a white servant both disappeared upon learning that the girl was pregnant. According to M. Gardien, M. Valentin has related a case similar to the one above. A mare foaled a colt and a young mule at an interval of a quarter of an hour; she had been covered by a horse, and five days after that by an ass.

Granting all possible authenticity to these observations, and supposing their correctness to be demonstrated, the ideas of physiologists that prevail at the present day admit of their easy explanation. Two ovules may become impregnated, one after the other, in a woman who grants her favors to two or more men on the same day, or in the space of two or three days, that is to say, up to the moment when the excitement of the first fruitful coition occasions the effusion of that coagulable lymph in the cavity of the womb which afterwards becomes the *membrana caduca*.

Of two germs vivified by the same copulation, one may not descend into the uterine cavity until a considerable time after the other; the maturity of the two ovules may not have arrived at the same degree of perfection at the instant of their union with the principle furnished by the male; one of the germs may happen to be disengaged with difficulty from the ovary, remain adhering to it without growing with the same rapidity as its congener, and not escape from the vesicle nor pass into the tube until after a greater or less lapse of time.

I am astonished that modern physiologists, and even some medico-jurists, have admitted the existence of superfetation up to the moment when the ovule reaches the womb, while they deny the possibility of its occurring after that period. It ought to be equally rejected in both cases. The concrescible lymph or anhistous membrane is fully as capable as the ovum itself of intercepting all contact between the seminal principle of the male and that of the female. The four examples reported by Millot evidently belong to one of the preceding categories. The same is the case with the two observations of Dewees, in one of which we see that an embryo and its membranes escaped with the foetus at term, and in the other, that a white and a black child were delivered together. The case in

which Maton says that one of the children, well developed and living, came at term, and that another fetus, equally strong, was not delivered until three months afterwards, would be much more embarrassing than it is, if it was not so barren of details. To conclude, superfetation may take place; 1. In the case of extra-uterine pregnancy; 2. In that of a double uterus; 3. Where a woman has had commerce with two different men on the same day, or even at short intervals with the same man; 4, and lastly, while the uterine cavity is not filled with any substance, and the orifices of the tubes remain perforate, a second fecundation is not altogether out of the question. We may then admit that all which has been said, up to the present time, of superfetation may be placed in one of the grades of multiple pregnancy.

PART III.

PHYSIOLOGY OF THE FŒTUS.

THE nutrition, circulation, respiration, and the viability of the fœtus are the only organic properties which it is necessary to examine here.

CHAPTER I.

NUTRITION.

ALL of the proposed hypotheses as to the mode of nourishment of the fœtus are resolved into two principles. The one is, that the alimentation is derived from the ovum itself; the other, on the contrary, is that it is from the circulatory system of the mother.

SECT. I.—AT THE EXPENSE OF THE OVUM.

Few questions in physiology have occupied so much of the attention of the learned as that of the nourishment of the fœtus. Different authors have by turns placed its source in the liquor amnii and in the placenta, in the umbilical vesicle, and in the allantois, in the gelatin of the cord, and in the caducous membrane, and in the mother's blood.

What I have elsewhere said of the *anhistous membrane* and its fluid seems to me to prove at least that that tunic cannot concur in the development of the ovum longer than during the first fortnight of its existence.

The *gelatin of the cord*, which Wharton and Rouhault supposed to play a part in the matter, has no more to do with it than the caduca.

ART. I.—OF THE LIQUOR AMNII.

The idea of making the fœtus live upon the fluid with which it is surrounded is the most ancient of all, and apparently the most natural; it gives rise to two very distinct theories; by one, the water of the amnios is supposed to be swallowed and digested; according to the other, it is absorbed in various ways.

A. In order to prove that the *water of the amnios* serves for the nourishment of the fœtus, the old writers, particularly Harvey and Diemerbroeck, have treated at great length on its nutritious qualities, and on the lactescent matter which, in their opinion, it always contains; later authors have relied upon the assertion that small animals plunged in it live longer than they do when plunged in common water; on its being more abundant and fuller of nutritive principles, in proportion as pregnancy is less advanced; on the diminished power of absorption in the

cutaneous surface of the fœtus, as it approaches nearer to the full term; and on certain cases of fœtuses being born alive without any umbilical cord.

Without stopping to refute these various propositions one by one, it may be remarked that, previously to drawing practical consequences from them, their correctness should have been ascertained; but it has never been proved that the liquor amnii is more nutritious at the beginning than at the close of pregnancy; or that the fœtus absorbs more at one time than at another. As to the observations of Van-der-Wiel, of Dennis, of Littre, and of Chatton, on the absence of the umbilical cord, and on the rupture and cicatrization of its divided extremities, they are too improbable, and accompanied with details far too vague for them to deserve the least credit.

Nothing warrants our believing, with Levret, that the waters are taken up by the cutaneous surface. Van-den-Bosch, it is true, tells us he saw the lymphatic vessels full of a fluid resembling the water of the amnios, and that they became fuller in the limb of a cow's fœtus, strongly bound round with a ligature and plunged in the liquor of the membranes; but even admitting the experiment to be correct, what conclusion can we draw from it? Are not the lymphatic vessels habitually filled with serosity? Do they ever fail to become distended when a mechanical obstruction prevents the free passage of the blood through a part, or the whole of a limb?

B. Founding on the opinion of Hippocrates, of Rudbeck, &c., and on some facts of his own, Diémerbroeck maintains that the fœtus is nourished by the mouth. His reasons are, that the child's stomach is always filled with a lacteous matter; that there are excrements in its bowels; that immediately after birth, or previously to sucking, it frequently vomits a whitish fluid; that it sucks a finger if put into its mouth, even while still within the sexual organs; and that its stomach would not be able to perform its digestive function immediately after parturition, if it were not previously accustomed to it. If asked whence the fœtus derives this nourishment, he answers that it is at first from the seminal fluid, and subsequently from the lacteous juice contained in the amnios!

Haller adds, to the reasons of Diémerbroeck and La Courvée, that the amniotic liquid has been found in the stomachs of many fœtuses; that in a pregnant cow that had been frozen, Heister found the mouth, œsophagus, and stomach of the fœtus filled with an icicle which was continuous with the waters; that many observers have met with silky hairs in the meconium; and they conclude that all these matters could not have reached the digestive passages by any other means than deglutition. Lemoine says, besides, that Aldes found bands of hair in the digestive tube of some calves, and that in a fœtus seen at Leeds, the lacteals were observed to be filled with chyle, which was also the case in a fœtus eviscerated by the malpractice of an accoucheur.

More recently, this opinion has been strengthened by the case of a fœtus in which the bowel was completely divided near the cæcum, and which contained meconium in the portion next to the stomach, while the larger intestine was almost completely obliterated; by another case mentioned by M. Dubois, in which the alimentary canal, being contracted near the pylorus, contained meconium only in the part above the contraction; and lastly, by the fact that Béclard, having colored the liquor amnii with ink, in a bitch that he experimented on, found some of it in the œsophagus and stomach of the young.

None of these proofs are conclusive; most of them do not even deserve to be seriously combated. The presence of hairs in the intestines might, in fact, be explained in another way; but the cases of that kind that have been reported are far from authentic. To the facts noticed by MM. Desgranges and Dubois, may be opposed one published by M. Piet, and in which the intestine, though separated from the stomach, is said to have been, nevertheless, filled with meconium. I have myself dissected a fœtus, at full term, whose œsophagus, upon reaching the

diaphragm, ended in a completely impervious blind sac, notwithstanding which its colon was full of meconium. While enclosed in the membranes, the mouth of the fœtus is closely shut, at least until a pretty advanced stage of pregnancy: to swallow, either by suction or deglutition, it should be able to perform the motions of inspiration and expiration, of elevation and depression of the larynx. Acephalous and astomatous fœtuses, and those which come into the world with all the openings of the mucous membranes occluded, are not on that account less completely developed, and their alimentary canal, according to the reports of certain observers, does not contain less of meconium or of hairs. Burton obtained, on the 4th of January, 1749, an acephalous fœtus of large size and well developed. He cites others in which the natural openings were closed. The same author says that Bellanger found meconium in the intestines of a pig which had no mouth, and that Antoine has made the same remark concerning a lamb, which had neither head nor heart.

It does not necessarily follow, from the circumstance that liquor amnii has been found in the stomach, that the fœtus swallows and is nourished by it. Would it be right to infer that a swimmer naturally drinks water, because we find some of it in the stomachs of drowned persons? Finally, ought it not to be enough to decide for ever the question as to the nutritive properties of the liquor amnii, to observe that Bartholin and M. Morlanne and myself, at the Hôtel Dieu, April 18th, 1834, have seen the fœtus continue to live in the womb more than a month after the complete evacuation of the waters. Burton affirms that he saw, on the 12th of January, 1750, a strong and well-formed child delivered without any water!

It is therefore superfluous to inquire whether the water of the amnios, after passing into the intestines, is simply absorbed from them, as was thought by La Courvée to be the case, or whether, as Diemerbroeck pretends, it must undergo a previous digestion in those organs.

C. Neither is it necessary to refute M. Lobstein, who is not far from making it pass in, partly, by the genital organs of the fœtus; nor Osiander and Muller, who make out that it is absorbed, then modified by the breasts, to be subsequently carried to the thymus gland and thoracic duct; nor, finally, Schurigius, David, Winslow, Héroldt, Bécлар, Hoffmann, and M. Geoffroy Saint-Hilaire, who believe that it penetrates into the trachea and bronchia, in order to be there elaborated, or serve in some way for the purposes of the fœtal nutrition.

ART. II.—BY THE PLACENTA.

Notwithstanding the importance attributed by some writers to the water of the amnios, all the authors, except La Courvée and a few others, have confessed that the *placenta* performs the principal part in the nutrition of the fœtus, at least during the latter half of the period of gestation.

There are some who, with the ancients, suppose that the placenta, by means of some peculiar lymphatics, takes up a milky juice, a real chyle, for the purpose of modifying or transmitting it to the organs of the fœtus.

Others have asserted, as M. Jœrg, that the placenta takes nothing from the womb except the *oxygen*; that it performs the functions of a respiratory organ; that it is the physiological *lung* of the fœtus; and that in this view the uterine arteries represent, in some measure, the bronchia and trachea.

SECT. II.—AT THE EXPENSE OF THE MOTHER.

A majority of writers maintain that the fœtus is nourished and developed by blood furnished to it by the mother. This is another disputed point: is it real blood, or only some of its principles? Does it pass directly from the vessels of the mother into the circulatory system of the fœtus? Is it merely poured into

the sinuses of the placenta? Must it, or must it not be subjected to some preparatory elaboration before it reaches the placenta?

ART. I.—BY DIRECT CIRCULATION.

A. Hunter and a majority of accoucheurs have been of opinion that the blood passes directly from the mother to the fœtus. This opinion, adopted by Vesalius and Columbus, was taught by Mauriceau and Peau. The partisans of this hypothesis, which has been combated in detail by Diemerbroeck and Everard, rely upon the existence of vessels passing from the womb to the placenta; on this latter body having been seen, as by M. Ribes, to grow and live after the expulsion of the fœtus; on the circumstance that the detachment of the placenta, whether during pregnancy or after delivery, always gives rise to hemorrhage, that the uterine hemorrhages cause the fœtus to die exsanguis; on blood having been observed to flow from the placental end of the cord during labor, so as to constitute a dangerous hemorrhage; on M. Magendie's having found the odor of camphor, and the coloring matter of madder, in the young of animals fed on those substances; on the presence of large orifices observed by various authors on the internal surface of the womb; on the fact that the best mode of arresting flooding is to compel the womb to contract; and, above all, on the passage of various substances, when injected by the uterine vessels, into the organs of the fœtus. We may cite also the instance reported by M. d'Outrepont of a fœtus poisoned by opium which the mother had taken, and that of M. Joffly, who, in performing the Caesarian section, saw an oozing of blood from the whole of the interior of the uterus.

None of these reasons are demonstrative. We have seen, above, that it was necessary to imagine the existence of vascular anastomoses between the ovum and uterus. Supposing the placenta does sometimes remain adherent to the uterus, and continues to live, that does not at all prove that there is a direct sanguine circulation from one to the other. It is false to say that the detachment of the placenta always occasions hemorrhage; and, even if it were true, it would no more militate in favor of than against the idea of immediate anastomoses, for the blood in that case may just as well be poured out by exhalation, as from ruptured vessels. If it be true that the heart and vessels of the fœtus are emptied of their blood when the mother dies with hemorrhage, Wrisberg proves that the contrary has been very often observed. Mery has shown that a bitch dying of hemorrhage, the pups still lived half an hour afterwards. Besides, it does not follow, because a child is born anemic after a uterine hemorrhage of several weeks' duration, that the blood passes unchanged to the cord, for, if the woman be for a long period anemic herself, it is very natural that the fruit of her womb should also be feeble: further, it seems to be forgotten that many hemorrhages, as those that depend upon insertion of the placenta over the cervix, may come from the vessels of the placenta, and consequently from the fœtus, as well as from the mother. If the blood passed directly from the mother to the ovum, it would be impossible that the placenta could be detached before the delivery of the child, without giving rise to hemorrhage. The science, however, possesses examples of this. I have witnessed a case with M. Mercier in 1829; I saw the woman at eleven o'clock in the morning, and then the labor had lasted many hours. The detached placenta was almost entirely in the vagina. There was no sign of hemorrhage. The delivery did not take place until five o'clock in the afternoon. The placenta passed out first, and the child was dead, but without any change. M. Pardigon reports a case very similar, and says that M. Baudelocque observed one like it, and that a third occurred in the practice of M. Cauvière. The thesis of M. Doudement contains a fourth, and M. Labayle cites two of the same kind. If in simple or compound pregnancies the blood flows from the uterine extremity of the cord, after it is cut, it is not because the circulation continues between the womb and the placenta,

but it is in consequence of the uterine contractions, and the retraction of the proper placental vessels and of those of the cord, or because there exists, in the fetal portion of the after-birth of twins, the free anastomosis of which I have spoken elsewhere. It is the placenta which gets rid of the fluid which it contains, and not fresh blood flowing from the mother. M. Lallemand, who in a case of twins at the Hôtel Dieu witnessed a hemorrhage from the cord of the child which was delivered first, understood very well that it was due to the passage of the blood from one ovum to the other. In the two observations of the same kind related by M. Mancel, the pulsations of the cord, corresponding, according to the author, to those of the mother's heart, give rise to an embarrassment, but such an occurrence is so different from what is otherwise known, that it would be indeed necessary to meet with it again before admitting it without hesitation. The presence in the fetal organs of medicinal or alimentary substances taken by the mother is explained by the laws of imbibition or by absorption quite as satisfactorily as by an uninterrupted continuity of the vascular systems of the ovum and uterus.

B. Anatomical injections have been in vain attempted by Ruysch, Haller, A. Monro and D. Monro; but, as a thousand negative facts do not destroy a single positive one, these injections are constantly appealed to in support of the hypothesis in question.

M. Dubois formerly exhibited to the Academy of Surgery a specimen he had prepared, and in which the injection passed into the placenta, through what he denominated the placento-uterine vessels; Chaussier succeeded in impelling mercury into it; Béclard and M. Dugès have succeeded with colored oil. In the body of a pregnant woman prepared for examination, C. Baudelocque saw the uterine sinuses completely filled with injection, continuing without any line of demarcation into the placental sinuses, which were also filled with the same material. Mr. D. Williams has recently performed some experiments, from which it appears that linseed oil, injected into the aorta or hypogastric arteries, penetrates into the organs of the fœtus; and M. Biancini, who has performed experiments on one woman who died whilst in labor, on another who died in a week after delivery, and on a third who died with flooding, as also on cats, rabbits, and cabiais, assures us he obtained the same results with size and with mercury, which, he thinks, answers better than oil. In addition to the utero-placental arteries, the Italian physiologist describes a set of veins of a corresponding character.

But it seems to me there is a strange misconception of the value of such experiments. How happens it that they have not been regarded as but little applicable to the explanation of what takes place in the living female? How long has the passage of foreign matters from one vessel to another proved incontestably that the same thing takes place with the natural fluids during the life of the individual?

When a very fine injection is thrown into the arteries of the belly, the matter readily escapes from the internal surface of the intestines; when thrown into the vena portæ, it returns not only by the veins and the hepatic artery, but also through the excretory bile ducts; when thrown into the emulgent artery, it soon passes into the emulgent vein, as also into the pelvis of the kidney, and the ureter. Notwithstanding the above, we do not conclude that the blood during life is continually transuding into the alimentary canal, nor that it passes from the vessels of the liver into the hepatic ducts, or from the kidneys into the tubuli uriniferi and ureters; the oil, glue, and mercury employed by Chaussier, and Messrs. Williams and Biancini, are of too penetrating a nature not to go wherever it may be desired to send them; but, whether the passage in question does or does not take place, it will certainly never serve to solve the problem at issue. The results obtained by M. Biancini have been besides fully combated by M. Rigolli, who refutes, at the same time, similar experiments made with mercury by M. Casa-

bienca. Holland, who has made many experiments on cats, hares, &c., says, on the other hand, that mercury thrown into the aorta passes into the uterine portion of the placenta without ever reaching the vessels of the cord. In the case of a woman who died while pregnant, and who was injected by M. Lebreton, the black matter thrown into the aorta of the mother penetrated into the caverns of the placenta, and the red matter thrown into the aorta of the fœtus traversed the placenta, and was mixed with the black masses, as when the injection is directed by the veins; but the uterine sinuses were empty and a direct communication was not demonstrated. Burns, who admits the vascular connection between the placenta and womb, does not prevent Mr. Blundell and Dr. Horner from denying entirely a direct circulation between the mother and the fœtus, nor M. Baer from establishing in principle that, in the mammiferous animals, the vessels of the mother never reach those of the offspring.

C. Hunter and several modern physiologists expect to get rid of the difficulty by admitting, with Astruc or Burton, that the uterine sinuses pour their blood into the sinuses or interlobular anfractuosities of the placenta, whence it is subsequently taken up by the numerous capillary orifices of the umbilical vein. This hypothesis, although more specious and rational than the preceding one, is not, therefore, less difficult to adopt. Without referring on this point to what I have already said concerning these pretended sinuses, and their adaptation, I remark: 1. That such an arrangement cannot be admitted to take place in extra-uterine pregnancies. 2. That, until the second or third month, the placenta being composed of merely agglomerated filaments, there can be no sinuses betwixt its lobules. 3. That a placenta, although attached upon a fibrous polypus, or upon some indurated portion of the uterus, has, nevertheless, been found to supply all the materials required for the fetal nutrition. 4. That I have seen the uterine surface of the after-birth hard, coriaceous, and without any orifice throughout almost its whole extent, in women who were delivered of children which, although weak, indeed, were nevertheless living. This remark, which Puzos, who had before defended the hypothesis of a direct anastomosis, had occasion to make, induced him towards the end to change his opinion, and to adopt the idea of a simple transudation. 5. That the large vessels of the womb, said to be continuous with the vessels of the placenta, are, by the very partisans of the doctrine, admitted to be veins. 6. That the uterine veins being, like the veins of all other parts of the body, the vessels of a convergent and not of a divergent circulation, as they should be, consistently with that opinion, it follows that venous and not arterial blood must pass from the mother into the placenta. Besides, it is towards the surface rather than in the anfractuosities that the ultimate vascular ramifications are found.

D. Should it be insisted upon that the fœtus receives completely elaborated blood from the mother, it could only be possible, at the utmost, to say, as indeed it has been said, that that fluid enters the placenta, through simple pores, by a sort of imbibition which might be explained by a mere contiguity of surfaces. To this I can only object that the blood, as such, does not appear to pass in any way into the ovum. It certainly does not pass there, at least in the early periods; for the villous portions of the chorion do not contain vessels until pretty late, and, besides, its filaments are never hollow quite to their extremities. On the other hand, both Autenreith's and my own experiments demonstrate that the blood of the fœtus does not present the same aspect as that of the mother. It is at first of a rose color. It then becomes redder, then blacker, and does not exhibit any difference of color in the veins and arteries. Tiedemann and others have found that it contains a much larger proportion of serum than the blood of an adult, and is less coagulable; in fine, everything proves that its chemical composition is very different from that of the mother. Even although chemistry had not been able to ascertain these differences, would it be right to believe that this

fluid need not have, like our aliment, a due relation to the period of our life, whether extra or intra-uterine, and that the blood of an adult woman would not be, in some sort, a poison to so frail and delicate a being as the embryo, or fœtus? Were it worth while to insist upon this point, I might add that, according to the microscopical observations of MM. Prevost and Dumas, the blood-globules are so small in the fœtus that it would be impossible for those of the mother to pass through the same canals or same orifices, without destroying the equilibrium of all the functions, and producing sudden death. Burton, who, with Levret, already maintains, after his experiments and those of Monro and Vieussens, that the red globules of blood do not pass from the mother to the child, has also very well proved that a direct circulation is inadmissible; while Lemoine, his translator, does not indeed offer any objections of great value.

E. In conclusion, the nourishment of the ovum is dependent on various sources. At first it is a mere vegetable, which imbibes the surrounding moisture. The villi of its superficies, real cellular spongioses, acquire in the tube or in the womb the nutritive principles required for the development of the embryo vesicles; after which the embryo is nourished after the manner of the chick in ovo, or rather like the young plant, which is at first evolved at the expense of principles contained in its cotyledons. It gradually exhausts the vitelline matter contained in the umbilical vesicle. The emulsive substance of the reticulated body or allantois is also gradually absorbed. It reaches the end of the second month. The vessels of the cord are formed. The placenta soon begins to show itself, and suffices to keep up the evolution of the fœtus. By its contact, the spongy cake takes up from the womb the elements of reparation, and operates on them, forming a fluid more or less analogous to blood, which is then absorbed by the radicles of the umbilical vein. The placenta absorbs in the uterus, so as to form the fluids of the fœtus, just as the liver, the kidney, the seminal gland, &c., take up from their own vessels the materials from which to form the bile, the urine, the prolific liquor, &c.; as trees and plants absorb from the ground the principles of the numerous compounds they contain: and I see nothing in all these actions very difficult of comprehension.

ART. II.—CIRCULATION OF THE FŒTUS.

Whatever may be the manner in which blood or other fluids reach the placenta, it is, notwithstanding, necessary for them afterwards to traverse the various organs of the fœtus for their nourishment. However, the circulation does not in all respects resemble that which takes place after the birth of the child.

§ 1. ARRANGEMENT OF THE ORGANS.

In the adult, the septum that divides the two auricles of the heart is complete, and separates them from each other perfectly. In the fœtus, on the contrary, this septum has an opening through it, called the *foramen ovale*, which is largest in the early stages of pregnancy. Previously to birth, instead of two large trunks, the pulmonary artery furnishes only two small branches to the lungs; but it is prolonged, under the name of the *arterial canal* (*ductus arteriosus*), as far as the aorta, into which it opens below the left subclavian artery. The hypogastric branches of the primitive iliaes send only small branches to the pelvic organs, which are as yet scarcely developed; but they rise along the sides of the bladder and urachus, under the name of *umbilical arteries*, and proceed to the umbilical ring and to the cord. Unlike the adult, the fœtus also has an *umbilical vein*, which, upon entering into the abdomen, proceeds backwards and upwards, and somewhat from left to right, so as to pass into the longitudinal fissure of the liver, through which it passes, giving off here and there a branch to the right and left lobes of the liver. M. Mende has seen it pass directly over the convex face of the liver, into

the right auricle, without dividing. Having reached the under surface of the liver in the transverse fissure, the umbilical vein divides into two trunks. One, which is called the *venous canal* of Arantius (*ductus venosus*), and which, like the *ductus arteriosus*, grows smaller and smaller as the term of gestation approaches, appears to be a continuation of the primitive vein, and proceeds to open into the trunk of the vena cava, below the diaphragm, the auricular opening of which is bounded by a large valve, known under the name of the Eustachian valve. The other, which constitutes the right branch of the vena portæ, penetrates into the liver, where it at length anastomoses with the radicles of the hepatic veins, which, as in the adult, proceed to open into the vena cava a little above the *ductus venosus*.

§ 2. COURSE OF THE BLOOD.

From the above arrangement of the circulatory organs, it is evident that the course of the fluids must be much more complicated than in the adult. From the smaller branches of the umbilical vein, the blood passes into the larger ones, and soon afterwards into the great trunk of that vessel; it then passes along the cord through the umbilicus, and divides beneath the liver into two principal currents, one of which follows the venous canal so as to go and be mixed with the blood of the inferior cava, while the other proceeds along the umbilical branch of the vena portæ, to ramify in the right lobe of the liver, and to be taken up by the hepatic veins, which pour it into the trunk of the cava as it passes through the diaphragm. There it forms three columns; that of the venous canal, that of the hepatic veins, and that which is brought by the cava from the lower half of the body, which unite, and together enter the right auricle, thence passing through the foramen ovale into the left auricle; from the latter, the blood falls into the corresponding ventricle, which forces it along the aorta towards all parts of the body, but chiefly to the head and upper extremities, by means of the brachio-cephalic trunk, the left carotid, and the subclavian.

After losing among the tissues the nutritive principles with which it was charged, the blood is brought back by the jugular and the axillary veins to the subclavians, and thence to the superior cava, which also receives that of the *azygos*; the superior cava carries it to the right auricle, the auricle to the right ventricle, and the latter to the pulmonary artery, which directs only two small columns of it to the lungs, and causes the rest of it to pass through the arterial duct to the descending aorta, where it meets with a part of what the left ventricle had already expelled. That portion which reaches the primitive iliacs is in part distributed to the lower extremities by the external iliacs; but by far the largest portion of it returns along the umbilical arteries, through the cord, and at last to the placenta, whence it set out.

A. *In the heart.*—Haller, Wolf, Sabatier, Portal, M. Richerand, &c., supposed that the blood of the two *venæ cavæ* does not mix at all in the right auricle; that that of the ascending or inferior cava passes entirely to the left, and that of the superior cava entirely into the right ventricle.

Bichat was opposed to this view of the subject, and Legallois and M. Magendie do not adopt it. It is difficult, say they, to understand how two columns of fluid can pass into the same cavity without being mixed together. The two auricles contract simultaneously, and not one after the other. It is not probable that the vivified blood furnished by the umbilical vein passes wholly to the superior half of the body, and that the venous blood alone is expended in the remaining moiety. But seeing that the vena cava inferior, surmounted by the Eustachian valve, seems to be continuous with the foramen ovale, rather than to open merely into the right auricle, and that the vena cava superior opens opposite to the orifice of the right ventricle, and on a plane which is rather in front of the inferior cava, it appears to me we may conceive that the blood of the two vessels may really pass into the

left auricle and left ventricle, without necessarily mixing. The simultaneous contraction of the auricles does not seem to oppose this transfer. The blood of the inferior cava does not pass through the foramen ovale during the contraction of the organ, nor does that of the superior cava get into the ventricle during that action. If they are both full of fluid at the moment the systole commences, what is to prevent their transmitting it, without mixing, into the corresponding cardiac ventricle?

I believe, therefore, that Sabatier's theory is the most correct, and that only a very small quantity of the blood poured into the right auricle by the two cavæ respectively is mixed there.

However, it must not be supposed that the head and limbs receive none but the blood brought to the heart by the umbilical vein and its branches, nor that the abdomen and inferior extremities are nourished only by the blood of the superior cava. On the one hand, it would be absurd to suppose that that which is driven by the left ventricle into the arch of the aorta, passes on into the carotid and subclavian arteries, without some of it descending along the thoracic aorta; and on the other, even were that the case, this blood is no longer as pure as it was on leaving the placenta, for it is necessarily mixed with the venous blood of the lower extremities and abdomen. This mixture was complete in a fœtus dissected by M. Lenoir, for the ductus arteriosus opened into the left subclavian artery, which sprung from a common trunk with the carotid of the same side, and yet there was nothing peculiar in the relative size of the different parts of the subject. Besides, it cannot be denied in many animals, as, for example, in reptiles at all periods of their lives. The Eustachian valve separating in some degree the entrance of the two venæ cavæ from the auricular dilatation, up to a very advanced period of gestation, compels its admission also for the first months of intra-uterine life.

Further, the blood that passes along the aorta descendens is not merely the blood of the *ductus arteriosus*, but with it also is mixed that of the inferior cava. I will add that the researches which M. Martin Saint-Ange has made on the development of the heart in the human fœtus and in vertebrate animals, have induced him to maintain that the blood, when it enters the right auricle, unites with that from the superior vena cava, before it reaches the left auricle, where it meets with that from the pulmonary veins, and consequently that the theory of Bichat approaches nearer the truth than that of Sabatier.

B. *In the placenta.*—Some persons have supposed that the blood brought back by the umbilical arteries is taken up by the uterine veins, and proceeds to be revived in the lungs of the mother, before returning to the ovum. Others have thought that only a portion of it is absorbed, while the rest passes immediately into the capillaries of the vein; that there is in some sense two circulations—one *greater circulation*, completely under the influence of the heart and lungs of the mother, and one *lesser circulation*, the only one really belonging to the fœtus. What has been said above will, I think, suffice to cause such opinions to be appreciated at their just value. I shall content myself with remarking, here, that, in order to admit of what is called a *greater circulation*, the pulsations of the foetal must be isochronous with those of the maternal heart. But the mode of auscultation introduced by M. Kergaradec proves, as it had indeed been before remarked by Diemerbroeck, that there is no such isochronism, and that the foetal heart beats one-half oftener than that of a majority of women.

If it were true that the blood of the umbilical arteries is poured, as pretended, into the placental sinuses, it evidently would mix with that of the uterine arteries, which, according to the same theory, is also deposited therein; if so, we must be compelled to believe that the absorbing mouths of the umbilical veins have the faculty of choosing the arterial blood out of this mixture, while the uterine veins take up only venous blood: such an idea is not to be defended. Besides, as the

matter of injection, even the coarsest, passes with astonishing facility from the arteries to the veins of the placenta without being effused on its uterine surface, it appears to me that we may with certainty conclude that the blood of the fœtus is not taken up by the womb.

The utero-placental vessels, described by many authors, do not in any manner invalidate this proposition; at first, nothing was more contradictory than the descriptions which were given of them; *exhibui arterias tortuosas, non ramosas*, says Albinus. According to M. Biancini, the canals are almost capillary. Many of those in the specimen examined by C. Baudelocque were of the size of a crow's quill, and appeared to terminate abruptly in the placenta, without undergoing any ramification. Hunter and M. Dubois saw vast numbers of them. They are rare, on the contrary, and irregular and twisted together, as shown by the plates published by R. Lee and Radford. Then they undergo no division or subdivision on entering into the placenta, which they traverse obliquely, but only to the depth of some lines. In fine, these are the vessels terminating in a cul-de-sac, the same, doubtless, which Astruc called blind veins. How then can we accord to them an anastomosis with the placental capillaries? This point requires new researches for its elucidation.

Hemorrhage from the cord after labor, is, indeed, the only valid argument in the dispute. A young woman was delivered alone; a surgeon arrived and found her almost dying from bleeding from the umbilical cord—which was at once arrested by the ligature. Solayrès, who saw three similar cases, was also obliged to tie the cord in one of them. Baudelocque has even gone further, for, after ligating the cord, he again untied it, and the hemorrhage recommenced. M. Chevreul says that on three occasions he was obliged to tie the cord to arrest the hemorrhage. I cannot explain in any way such facts as have been related. Observers so worthy of belief and so capable could not have allowed themselves to be deceived. However, they can convince no one who will take the trouble to study with care the vascular ramifications of the placenta. To the proofs of the contrary, which I have already given above, I would also add that, in an ovum which came away whole at full term, M. Marson saw the circulation continued for an hour, without the escape of any blood whatever from the surface of the placenta.

This does not, however, imply that the blood from the arteries re-enters the umbilical vein without undergoing any changes; but rather, only that these changes, purely molecular, are effected in the placenta itself. This elaboration, which Hamilton compares to a secretion, is not the less undeniable because its essence is not understood. It may be compared to that which is effected after birth in the general capillary system, and to that which occurs in the secretory organs and in the lungs themselves. The fluids of the ovum are brought into contact with those of the mother, and at that instant a change of principles is effected between them, just as takes place in the bronchia between the atmospheric air and the venous blood of the lungs; but here all our information is limited. The work of M. Martin, cited above, confirms fully this observation, and only adds to what has been already said on the non-existence of utero-placental vessels.

C. *In the liver.*—The truly enormous size of the liver during the intra-uterine life, long ago gave rise to the supposition that it was an organ of hematosis, or that it modified the blood in some manner. M. Lobstein appears to be still of this opinion. Fourcroy says that, if this modification does take place, it must consist in a kind of decarbonization and dihydrogenization. More recently still, MM. Prevost and Dumas thought they had observed that the first blood-globules of the fœtus appeared in the liver. If, says M. Geoffroy de Saint-Hilaire, the liver receives so great a quantity, and exhibits such a considerable size, it is that it may secrete a great quantity of bile, which being poured into the small intestine, occasions the formation therein of an abundant quantity of mucus which the fœtus digests, and on which it grows. Finally, Dr. Lee, of London, has just

performed some new experiments, whence it results that the use of the liver is to secrete an abundant albuminous and nutritive matter; that this substance fills the hepatic ducts, the duodenum, and small intestines; while in the stomach we find only an acid fluid, and meconium in the large intestines.

Of these different uses, not one is a matter of demonstration; those indicated by Fourcroy, M. Lobstein, and M. Geoffroy are even based upon mere suppositions, that are easy to overthrow; and although the theory of Dr. Lee and Dr. Prout is supported by some facts, it seems to be the dictate of prudence that we should wait before we decide, and admit that at present we do not know what influence is exerted by the liver on the fetal blood.

CHAPTER II.

OF THE RESPIRATION.

AIR being indispensable to respiration, it seems quite natural that that function should have no existence in the fœtus; but, on the other hand, as absorption of air or oxygen seems to be indispensable to the maintenance of life in all organic beings, attempts have been frequently made to prove that all animals respire during their fœtal life.

As to the human species, it has been said that the placenta receives oxygen from the blood of the mother at the same time that its own parts with certain heterogeneous principles, as, for example, a portion of its serum: this opinion, which is of ancient date, has been latterly defended by MM. Lobstein, Meckel, and Müller.

It is true that, in order to explain the changes undergone by the blood in passing through the placenta, we may compare that work to respiration, but to accept such a comparison to the very letter, the analogy would be very much forced. The blood which re-enters the umbilical vein is doubtless modified, but it is not redder than it is in the arteries; the change it has just experienced does not, therefore, in the least resemble that which occurs in its passage from the pulmonary arteries into the pulmonary veins of the adult.

Some other persons, and particularly M. Geoffroy de Saint-Hilaire, have admitted that the fœtus absorbs air or a vivifying gas from the whole surface of its body, by a kind of tracheæ like those of insects, or even by the pulmonary passages, which might in such case be compared to branchiæ, and that it respire after the manner of fishes; but I have already stated that the gas obtained by M. Lessaigne in his first experiments was only a compound of carbonic acid and azote, and I believe that I may affirm anew that the pretended openings observed lately in the regions of the parotids by different anatomists do not exist.

Some, however, have persisted in maintaining that the lung exerts a certain action on the water of the amnios; that it separates air or some other principle from it; in a word, that it exercises a sort of respiration. On this subject reliance has been placed on some researches made in Denmark by Scheele, Wiborg, Winslow, Héroidt, &c.; experiments that tend to prove that the liquor amnii fills the trachea and bronchia of the fœtus; on those of Béclard, who saw the same thing; and further, that the young of a bitch, still enclosed in the membranes, executed the motions of dilating and contracting the *alæ nasi*, and of the chest; lastly, on the fact that the fœtus has on more than one occasion been heard to cry while in the mother's womb.

But it has been seen, farther back, what ought to be thought of the presence of liquor amnii in the gastric or pulmonary passages of the dead fœtuses. De Buffon and Autenrieth, who got the fœtuses of animals to live in that fluid; Wrisberg and Oslander, who have both seen the human fœtus live ten and fifteen minutes out of the womb with the membranes unruptured, did not see the respiratory movement mentioned by Béclard. I, too, had an opportunity, in 1825, of witnessing a fact that was very curious, and well adapted to illustrate this point. A woman at the *Hospital de Perfectionnement*, and who said she was six months

advanced in pregnancy, was suddenly delivered at five o'clock in the morning of the 23d of August; the ovum, which came away whole, was received by M. Lafond, a resident student at the hospital. The specimen was immediately brought to me, and I placed it in a large bowl of tepid water. The fœtus did not appear to be of more than five months and a half; I left the membranes whole; I carefully examined the nose, the mouth, the abdomen and thorax of the fœtus, which continued to live in this way for thirty-six minutes, but I discovered no motion in the thorax, except the slight throbbing occasioned by the action of the heart. We were also able to convince ourselves that the water of the amnios had penetrated neither into the trachea nor the stomach.

CHAPTER III.

UTERINE VAGITUS.

As to the cries generally known under the title of *vagitus uterinus*, examples of it may be found in Albert Legrand, Libavius, Solin, Camerarius, Sennert, Bartholin, Deusingius, Velthuisius, Boyle, and Needham himself: but these accounts being given only upon the hearsay of old women, do not deserve the trouble of being repeated. The subject has come up again in our day. Nevertheless, Osiander, who reports seventeen observations, says that he has heard the cries in two different women. Richter has also given three examples. Zitterland also bears witness to one after having taken every precaution to avoid a mistake. MM. Henri and Jobert have observed the same thing at Paris, in 1825, in an incontestable manner, according to the report of M. Marc. A. Baudelocque has related another case. M. Lesauvage assures us that he has very distinctly heard the cries of young puppies while still in their mother's belly. Michaelis relates, as does M. Heyfelder, also the case of a woman in whom he distinctly heard the crying of the child within the womb.

When the membranes are ruptured and the waters discharged, as in the case given by M. Brendenelle, when the orifice is dilated, and the child's face engaged more or less deeply in the excavation, as in the examples of MM. Huguier, Olombel, &c., we may conceive, indeed, that the fetus might breathe and utter some cries before its complete expulsion; but still the state of compression and constraint of the thorax renders the possibility of such an occurrence very doubtful. M. Villeneuve, of Marseilles, has well shown the want of resemblance between the facts which Mr. Ward has published. M. Meissner, however, remarks that the observers, who at first denied the occurrence, have ended by believing them themselves, and to the preceding examples he adds those of Ficker, Scott, and Schmitt. It seems, also, that M. d'Outrepoint has met with three cases in five hundred and eighteen deliveries. When the ovum is entire, as in the case given by M. Lesauvage, the fact is so improbable that we are not authorized to draw any conclusions from it.

It is sometimes so difficult to avoid all the causes of error, all subterfuges, or tricks at ventriloquism, as M. Villot says, not to be deceived by strange and unexpected noises, such for example as are often produced by air in the intestines, that, before we admit as positive a phenomenon which it is impossible to reconcile with the laws of physiology, the same person should have ascertained its existence repeatedly; in the mean time, I may say with Fontenelle that, since learned and credible men have heard it, I will believe it, but I should not believe it if I had heard it myself.

Further, if the fetus really breathed; if air passes through its lungs, they would be permeable and spongy, while at birth they are, as is well known, quite compact, and as heavy as a slice of muscular tissue.

CHAPTER IV.

OF THE VIABILITY OF THE FÆTUS.

THE word *viability*, derived from *via*, is employed in medical jurisprudence to express the possibility of passing through the various phases of human life. To render a child *viable*, it should possess at birth an aptitude to live independently of its mother. From this definition, it will be perceived that a fœtus at term, as has been remarked by M. Billard, may be born not *viable*, provided it be affected with some faults of conformation, or with certain diseases; as also that a fœtus may be born *viable*, although dead when passing from its mother's womb.

At what stage of pregnancy is viability possible? Although debated by accoucheurs and physicians in all ages and countries, this question has continued until this moment undecided. The fœtus which, according to some persons, is *viable* at four months and a half, does not, according to others, really enjoy viability until the seventh month.

The law having determined that a child born before the one hundred and eightieth day after marriage may, if it is pronounced to be viable, be disowned by the husband, implicitly declares that viability commences with the seventh month. As a legislative measure, this decision is extremely wise, and could not be more just; but it does not by any means prove that a fœtus is never *viable* before the end of the sixth month, nor that it is always so at the commencement of the seventh. The determination as to the viability of the child ought to depend on the degree of perfection attained by the fœtal organs, and not on the stage of pregnancy. But, as the evolution of the fœtus is not always in the same ratio, it follows that an eight months' fœtus may be less *viable* than one of seven months.

Should we refer on this head to the cases related by various authors, we might have examples of children that were infinitely small, of some born at four months or four months and a-half, and, nevertheless, become robust and vigorous men. Who is unacquainted with the history of the celebrated Fortunio Liceti, related by Van Swieten? His mother, frightened by the roughness of the sea while passing from Reco to Rapallo, brought him into the world before the sixth month of her pregnancy; he was not bigger than a hand; his father had recourse to the heat of an oven to bring him up, and notwithstanding all that, Fortunio lived to be seventy-nine years old. An embryo, says Brouzet, was born in 1748, at the fifth month of pregnancy, and lived to the ninth month, without sucking, without producing any excretion, or performing any other motion than to swallow a few drops of milk; but, four months after its birth, it suddenly cried, and sucked, and moved its limbs, so that at sixteen months old it was stronger than children of that age commonly are. Thebesius also pretends to have seen a fœtus, born before the seventh month, which could not cry until the ninth, but which was still very weak after the lapse of a year. Pleissmann cites another such case, quite similar to that of Brouzet, except that the fœtus was born at a more advanced stage of the pregnancy. The daughter of P. Soranus, according to Cardan, came into the world at the sixth month: to nourish her they were obliged to pour milk into her mouth by means of a funnel, which did not prevent her from reaching a good old age. Spigelius speaks of a man who was born at the

commencement of the sixth month, and who was obliged to be kept wrapped up in cotton for more than six weeks. Montus says that the cup-bearer of Henry III. was born at five months; Avicenna, Diemerbroeck, Vallesius, and Mena speak of facts nearly similar, and quite as authentic!

Millot, who, in the matter of proof, does not seem to be very tenacious, speaks of a certain Julius Modié, born in the year V, at five months and a half, and who was so small and weak that at first he could not suck at all. This child, however, grew very well. Have we not also had, as proof of anticipated viability, the history of the famous Bébé de Nanci, who only weighed one pound at birth, whose first cradle was a *sabot*, says the Count de Tressan, and of which there is a wax model in the cabinets of the School of Medicine at Paris? Mauriceau goes still farther when he says that the wife of the porter of Saint Côme aborted with a fœtus of two months, a finger in length, and which was baptized alive. De la Motte pretends that he has seen one born alive not bigger than a humming bird. But I ask, what conclusion can we draw from observations so imperfectly substantiated, from facts encompassed with so many marvels, and citations so improbable?

While admitting, with Chaussier, M. Orfila, and some others, that none of the facts related by the authors demonstrate beyond doubt that the fœtus is *viable* before the seventh month, I cannot, however, agree with them that the thing is impossible. A woman came in 1825 to be delivered at my amphitheatre, after she had had a fall; her last child was six months and three days old; she supposed herself to be only five months gone with child; and if she had had commerce with her husband fifteen or even twelve days after her lying-in, it was at any rate impossible for her to have entered on her seventh month. Now this woman brought into the world a little girl that weighed two pounds, which besides presented all the appearances of a fœtus of about five months, whose cries were so weak they could scarcely be heard, who notwithstanding breathed, and lived in this state for four days.

In the course of the same year, a young woman miscarried at the Hospital de Perfectionnement. Having been delivered of a child at term, five months and twelve days before, in the same hospital, it was impossible for her to be more than five months pregnant. The fœtus she brought forth weighed only one pound and a quarter; its skin was of a bright rose color, and had on it no down nor sebaceous matter; its length from the vertex to the sole of the foot was only nine inches. Notwithstanding this, my attention and that of the pupils was attracted to it by some stretchings and slight movements of its limbs. We wrapped the delicate creature in cotton, and placed it near its mother, who was told to pour a few drops of milk into its mouth from time to time; but, as she thought such an abortion could not live, she did not judge it proper to do anything to prevent it from dying. It expired, in fact, the next morning, twenty-eight hours after it was born. I saw a similar case at the Hôtel Dieu in Paris, in 1834.

My object is not by any means to maintain that these fœtuses were *viable*; nor, moreover, that that one was, of which Portal speaks, which was only four months old. I merely wish to show that it is not strictly correct to say, in a positive manner, that a child born previously to the last three months of the pregnancy must be reputed not *viable*. M. Meli, who professes the same opinion which I do, has surrounded it with so many proofs that it seems to me to be difficult of refutation at the present day.

A fœtus is *viable* when sufficiently developed to move its limbs, and when it really does move them; when it cries and breathes freely; when its head is covered or begins to be covered with hair; when its skin is no longer transparent, is covered with down, and coated with sebaceous matter; when the bones of the cranium touch along the greater part of their edges, and the sutures and fontanelles are consequently very much closed; when it passes off its meconium and urine;

when the proportions and dimensions of the different parts of its body are not too far removed from what is observed in fœtuses at term: and not because it is exactly seven months old or more. For the same reason it ought not to be declared not *viable* because it is born before the three last months of gestation, but rather because the absence of its cry, a respiration scarcely discernible, very feeble motions, inability to take hold of the nipple or finger, to void its meconium and urine, softness and separation of the bones of the head, the absence or fewness of the hairs, the transparency and red color of its skin, the want of a sebaceous deposit, the thinness of its nails, &c., prove that its organs are still far from the degree of perfection necessary for the maintenance of its exterior life.

Hippocrates and many other physicians of antiquity taught that the fœtus is more *viable* at seven months than at eight. At first view, such a proposition appears somewhat absurd. All other things being equal, a fœtus likely to live at the seventh month will be *viable* if not born until the eighth month. Mauriceau and De la Motte long ago maintained it, and the moderns have adopted completely the opinions of these celebrated practitioners. The very strong movements of the fœtus about the seventh month, and which gave rise to a belief in the somerset, rendering premature delivery much more common at that period than at any other, led the ancients to draw from it the conclusion that the seventh month is a natural term of pregnancy, and that if the fœtus over-passes that, it could not be born without danger until the end of the ninth month. It is difficult to understand how they should have made a double mistake on this subject, unless, with M. Dubois, we admit as a fact that, if labor takes place in consequence of the lively agitation of the fœtus, as pretty often happens at the seventh month, the cervix dilating with its accustomed gentleness and regularity, the child will be exposed to less risk than if born at eight months, when delivery is provoked by a fall or some other external accident. In the former case, in fact, early parturition is in some sort natural, while in the latter, as Dewees remarks, it is only a kind of abortion.

PART IV.

OF THE TERM OF GESTATION.

THE natural duration of gestation in the human species is generally nine months, or rather two hundred and seventy days. "Man only," says Aristotle, "is born at seven, eight, nine, or ten months; the last-named period is the most common; sometimes, however, pregnancy lasts until the commencement of the eleventh month." According to Pliny, gestation may continue a whole year. Riolan thought he had seen pregnancies of twelve, thirteen, fourteen, fifteen, and even of eighteen months. Kiperus, according to Millot, and Chanvalon pretend that the duration of pregnancy varies according to climate. Heister thinks we may establish that the term of nine months is the most ordinary one, and that the time fixed by nature is that which elapses from the seventh to the eleventh month. Sennertus thinks that every birth should be deemed regular that happens within one year. Blancard, Hoffmann, Mauriceau, Schenk, and De la Motte have related cases confirmatory of the opinion of Heister. Levret contents himself with advancing that the woman most commonly carries the child nine months, that many exceed that term, but that few go beyond the tenth month.

CHAPTER I.

RETARDED BIRTHS.

IN a cause that was pleaded by the celebrated lawyer Gerbier, the duration of pregnancy suddenly gave rise to some very animated discussions, about the middle of the last century.

Haller, Bertin, Lieutaud, A. Petit especially, and Lebas, Vioq-d'Azyr, and Roussel, who were partisans of protracted pregnancy, were vigorously opposed by Bouvart, Hebenstreit, and Louis. The latter author had no difficulty in demonstrating, as Courtin has already said, that the numerous histories of protracted pregnancies mentioned by his antagonists prove nothing in the present case, and that women scarcely ever know the precise period at which they were fecundated; but he was wrong to appeal to the immutability of the laws of nature, and the necessity of not interfering with social order. On the other hand, Petit, Bertin, and Lebas too complaisantly admitted as proved what was not even in every instance probable; so that, in spite of the numerous analogies with which they fortified their opinions, and the observations made by the two surgeons, Pennenc and Dulignac, each one on his own wife, the question remained undecided both by naturalists and physicians.

At present, the state of the case is changed. The antagonist of Petit relied chiefly on the circumstance that, according to Aristotle, "the period of gestation in animals is limited to a fixed space, and the term at which they bring forth is not subject to any variation." But, as Buffon had before pointed out, this asser-

tion is wholly false. Willer saw the hatching of eggs in the same nest vary from eighteen to twenty days. Millot speaks of a cow which brought forth its calf five days after the term; and of a cat that kitted nine days before the regular period. Besides, M. Tessier, member of the Academy of Sciences, a man whose honor and good faith cannot be called in question, has removed all doubt upon this subject.

He found that, of one hundred and sixty cows, which commonly carry their young nine months, as women do, only three brought forth on the two hundred and seventieth day; that fifty of them went from the two hundred and seventieth to the two hundred and eightieth; sixty-eight from the two hundred and eightieth to the two hundred and ninetieth; twenty to the three hundredth; and that five of them did not calve until the three hundred and eighth day, which is thirty-eight days beyond the term. On the other hand, fourteen of them calved from the two hundred and forty-first to the two hundred and sixty-sixth; so that we find sixty-seven days between the two extremes.

Of one hundred and two mares, whose term is eleven months, three of them foaled on the three hundred and eleventh day; five from the three hundred and tenth to the three hundred and thirtieth; forty-seven from the three hundred and fortieth to the three hundred and fiftieth; twenty-five from the three hundred and fiftieth to the three hundred and sixtieth; twenty-one from the three hundred and sixtieth to the three hundred and seventieth; and one on the three hundred and ninety-fourth day, which gives a latitude of eighty-three days.

Thus, far from being fixed, the duration of pregnancy, in brutes, is, on the contrary, extremely variable, and as the habits and constitutions of women render them incomparably more liable to impressions than any of the inferior species of animals, it is evident they must be liable to the same irregularities. Besides, the following proof taken in the human species, and admitting of no reply, is related by M. Désormeaux. A lady, the mother of three children, was seized with insanity in consequence of a severe fever, and all the resources of hygiene and therapeutics had been exhausted upon her case in vain; a physician thought that a new pregnancy might perhaps restore her intellectual faculties. The husband consented to note down in a register the day of each sexual union, which took place only once every three months, so as not to interfere with any still imperfect conception. Now, this lady, who was watched by her servants, and who was, moreover, endowed with very rigid principles both of morality and religion, was not confined until the lapse of nine months and a half.

Being agitated anew in a celebrated cause before the House of Lords, at London, in 1825 and 1826, this question was decided in the affirmative; but the physicians did not agree upon a fixed term which must be always admitted. Out of twenty-five who were examined, seventeen said that pregnancy terminates about the thirty-ninth or fortieth week, or betwixt the two hundred and seventieth and the two hundred and eightieth day; but some of them did not consider the case of Elizabeth Adderly, the wife of Lord Hyde Gardner, who was brought to bed on the three hundred and eleventh day, as impossible. Dr. Blundell mentioned one pregnancy of two hundred and eighty-seven days. Dr. Merriman said he had seen several of two hundred and eighty-five, and two hundred and eighty-seven days; two or three of two hundred and ninety-six, one of three hundred and three, and one of three hundred and nine days.

From a mass of four hundred and five observations collected at the Hôtel Dieu by himself and Madame de Lamarche, Mauriceau noticed that the term of pregnancy varies from six to eleven months and eight days. Dr. Dewees relates one where the woman was not delivered until the two hundred and eighty-third day, &c. To these testimonials I may add a case which fell under my own notice. A woman in her fourth pregnancy computed that she was four months gone when she came to my amphitheatre. I distinctly felt both the active and passive mo-

tions of the foetus. Appearances of labor took place at the end of the ninth month, were soon suspended, did not return for thirty days, and continued imperfectly a whole week; so that in fact the delivery did not take place until the three hundred and tenth day.

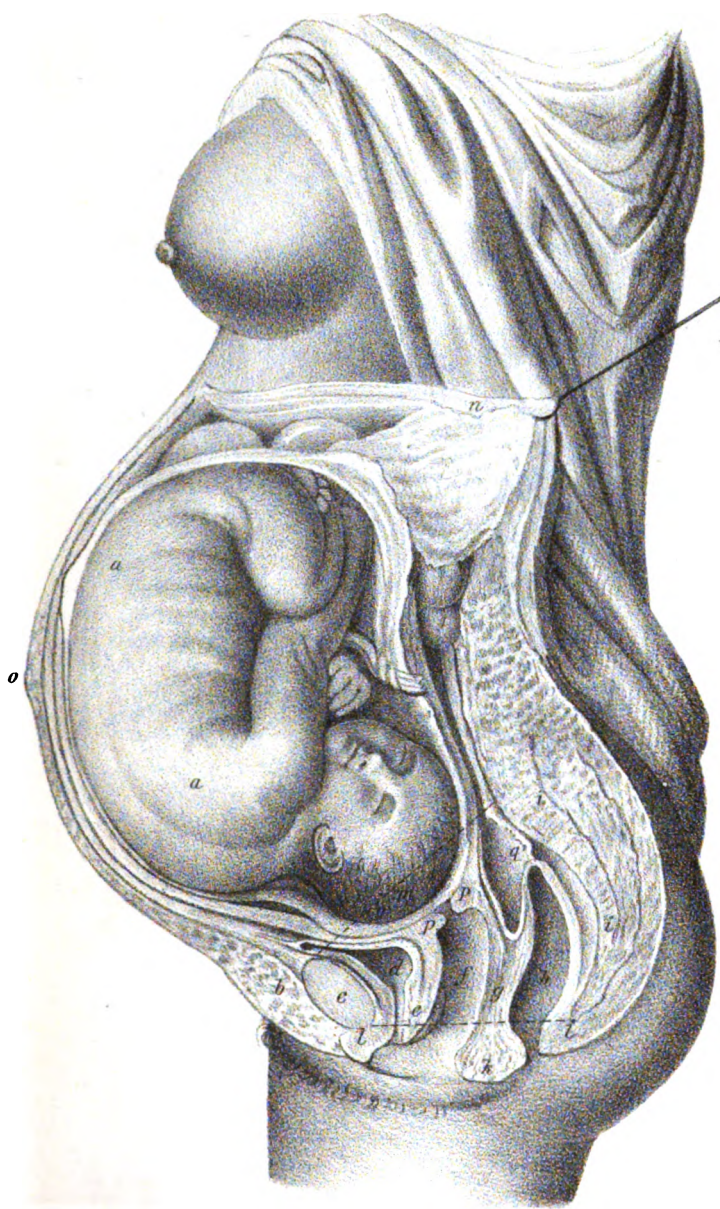
We may therefore conclude that tardy births are incontestable. To the eight observations which I published in 1829, I could easily add at the present time many others. Perhaps A. Leroy is not mistaken in considering them rare in the first, and as sufficiently frequent in subsequent, deliveries. In the present state of our knowledge, it is not possible to affix to them any precise limits. Moreover, since the French code, in order to do away anything arbitrary in the decision on such cases, has determined that the legitimacy of a birth may be contested when it occurs after the three hundredth day, or the tenth month, this point of physiology has lost much of its importance; for at present what is essential for the physician to know is, whether a child can or cannot remain longer than nine months in the womb.

PLATE V.

WOMAN AT FULL TERM.

THE FŒTUS IN THE SECOND POSITION.

- a, a.* Body of the fœtus.
- b.* Section of the mons veneris.
- c.* Section of the pubis.
- d.* Section of the bladder.
- e.* Vesico-vaginal septum.
- f.* The vagina.
- g.* Recto-vaginal septum.
- h.* The rectum.
- i, i.* Section of the sacrum.
- k.* Section of the perineum.
- l.* Coccy-pubic diameter.
- m.* Sacro-pubic diameter.
- n.* The abdominal parietes turned back.
- o.* The navel.
- p, p.* The lips of the os uteri slightly swollen.
- q.* The recto-vaginal excavation.



Singmaster Ltd

CHAPTER II.

OF PRECOCIOUS, OR EARLY BIRTHS.

IF fruits ripen sooner in certain climates and years than others; if the appearance of flowers, if vegetation generally may be more advanced: if the hatching of the chick varies from the eighteenth to the twenty-fifth day; if some cats, who carry their young only nine weeks, may bring them forth nine days before their term; if, out of one hundred and sixty-two cows, fourteen of them calve from the two hundred and forty-first to the two hundred and sixty-sixth day; if, out of one hundred and two mares, six of them foal from the three hundred and eleventh to the three hundred and twenty-sixth day, while their natural term is three hundred and thirty days; if sows, rabbits, &c., exhibit the same variety, wherefore may not the duration of human pregnancy be also advanced or abridged in the like manner? I do not see that anything reasonable can be objected against the possibility of precocious or early births.

Everybody knows that one foetus is sometimes larger and stronger at six months than another at seven or more; that a child at term is sometimes not so stout or tall as another which is only of seven or eight months' gestation; that on this point the development of the ovum exhibits varieties that are almost infinite; that the changes that take place in the organization of the womb, from the period of fecundation onwards, tend to develop in it a force similar to that which directs the action of the muscles; that, except in case of accidents, parturition is not effected until this force attains such a degree that the uterus may contract with the utmost force of which it is susceptible, which necessarily takes place sooner or later, according to an infinitude of circumstances; all these things are known, I say, and shall any one dare to maintain that precocious births are impossible?

BOOK V.

PRACTICAL DIVISION.

PART I.

ABNORMAL PARTURITION.

PARTURITION, or the escape of the product of conception, has received different names, according as it occurs at or before full term; and in the first instance it constitutes true labor; in the second it is called *fausse couche*, abortion, or premature labor.

CHAPTER I.

OF ABORTION.

WHEN the expulsion of the ovum takes place within the first six months of pregnancy, it is called an abortion, miscarriage, *fausse couche*, or *blesure*.

According to Aristotle, "if the fœtus comes away before the seventh day after the conception, the accident is called a show; at a later period, but before the fortieth day, the woman is said to be wounded." In the former case, it is an *efflux*, according to Bonacciolus, *effluxiones quæ intra diem septimam*; in the latter it is an *aborsus*—*aborsus quæ primis mensis*; or an *abortus*—*abortus quæ intra quadragesimam*. But these arbitrary and insignificant distinctions have been neglected for a century past both by physicians and accoucheurs.

SECT. I.—MECHANISM OF ABORTION.

ART. I.—FREQUENCY.

In twenty-one thousand nine hundred and sixty cases of pregnancy, Madame Lachapelle informs us that she observed one hundred and sixteen abortions. According to that author, miscarriages are more frequent at six months, then at five, then at three, than at any other period of gestation. M. Désormeaux, in accordance with almost all the ancient authors, with reason, and with my own observation, thinks, on the contrary, that it is the more common as pregnancy is

less advanced. If Madame Lachapelle mentions a different result, it is evidently because abortion in the early periods does not occasion so much inconvenience to women as to cause them to go to the hospital—which is not the case after the first half of pregnancy has been passed through; or, perhaps, because in the first six weeks the ovum and the embryo, frequently confounded with clots of blood, induce the woman to suppose that she has only had a return of the menses, while at a later period she cannot make such a mistake. It is this, without doubt, which permitted Marcetus to say that abortion is more frequent than delivery at term. The statistics at Westminster give 147 in 515, and M. Deubel has given 35 in 420.

Morgagni was of opinion that he had noticed more abortions of female than of male foetuses; M. Désormeaux is of the same way of thinking, and says that, if the vulgar think differently, it is owing to the circumstance that in the early stages it is very easy, at a first glance, to mistake a girl for a boy. This remark, which had been previously made by Morgagni, is very just, provided it be applied only to the first two or three months. Madame Lachapelle has seen more female than male embryos, and more male than female foetuses. Upon the whole, abortions of females seem to exceed those of males in proportion to the approximation to the period of conception.

ART. II.—CAUSES.

It appears that the causes of abortion have been till lately but ill understood, and the labors of M. Désormeaux, of Madame Lachapelle, of M. Dugès, and Madame Boivin could not have come more opportunely to throw some light upon this matter. They may be divided into *remote* and *proximate* causes; or into *efficient* and *determining* causes. The proximate or efficient causes are constituted by the contractions of the womb, assisted by the muscular efforts of the woman; the determining causes may be divided into predisposing and occasional.

§ 1. PREDISPOSING CAUSES.

The *predisposing causes* may be connected with the state of the woman or of the ovum. Relatively to the woman, some of them depend on certain general dispositions of the economy, and others on a special state of the sexual organs only.

A. Diseases of women. General state.—Women who are plethoric, who menstruate abundantly and regularly, who are irritable, excessively sensitive, nervous, hysterical, lymphatic, of a fair complexion, weakly, sickly, who have large eyes and a *bluish sclerotica*; persons affected with syphilis, scurvy, rickets; those who have a badly-formed pelvis, some organic lesion, or any chronic disease; those who are asthmatic, dropsical, affected with cancer; those who are badly nourished, and those who compress their bellies by lacing, or wear their clothes too tight, miscarry more frequently than others: and the reason of it may be easily conceived. We may say with Juncker, and M. Stoltz reports a good example, that it is the same with fat women when they are not sterile. Marshy and unhealthy countries; certain atmospheric constitutions, formerly mentioned by Hippocrates, and frequently observed since his day, render abortions really epidemic at some seasons, as we see at Vienna in 1778 and 1779. Many authors say that they have observed epidemics of abortions. Such happened after the moist hot weather of 1696; after the dry summers of 1710 and 1711; after the mild and windy weather of 1776; after the very great heat of 1811; after the mild winter of 1816; after the rainy seasons of 1821, &c. Watching and fatiguing labor have also been classed among the predisposing causes of abortion. The age of the individual also has some influence. It is not now believed with us, as it was in the time of Saint Augustine, that a boy ten years old can impregnate his

nurse; nor, as Savonarella stated, that a girl of nine years of age can become pregnant. The girl mentioned at the Academy of Medicine in 1831 died at Paris, of cholera, and the autopsy established the fact that the genital organs had never been distended by the product of conception. Nor do we believe, with the Bishop of Selz, in the pregnancy of a woman eighty-three years of age; but experience proves that those women who become pregnant very young, before their development is complete, or very late in life, that is, after the period of the cessation of the menses, are more exposed to abortion than those between twenty and forty.

On the part of the sexual organs, they are all the chronic diseases to which they are subject, adhesions, deformity, displacements; alterations, whether scirrhus, encephaloid, or hydatiform; sub-inflammation of the ovaries, and all the disorders that it occasions; organic alterations of the Fallopian tubes; fibrous, polypous, or other productions in the tissue of the womb itself, or the neighboring parts; preternatural adhesions of the broad or round ligaments, or of the tubes or ovaries to the surrounding parts, or to each other; chronic metritis and all its consequences; anteversion and retroversion; scirrhus and cancer; transformations and affections of whatsoever nature; in fine, whatever may interfere with the easy and regular enlargement of the womb during pregnancy.

This class of causes, formerly noticed by several authors, amongst others by Hippocrates, Denman, and Delpach, has lately been well discussed by Madame Boivin in a memoir *ad hoc*, which, in fact, deserves the attention of every accoucheur. Its mechanism and frequency may be easily conceived of by reflecting on the affections that take place in a multitude of women at the period of puberty, before or after the occurrence of that revolution, and indeed at all periods of their lives; affections that are most generally occasioned by a material lesion of some portion of the generative system, and which do not commonly disappear without leaving behind them the indelible traces of their existence. Sometimes it is a tumor in the excavation that prevents the enlargement of the uterus; at others it is an ovary that has degenerated or been transformed into a cyst, and become lodged in the recto-vaginal fossa, a case of which came under my own notice; sometimes the right tube is glued to the ligament of the left ovary, and *vice versa*, and even descends, so as to adhere behind the cervix, of which I saw an instance in a woman who died when about three months gone with child; more frequently, there are encephaloid and scirrhus masses, either occasioned by the pregnancy, or whose germs existed previously to the conception, which, by affecting the ovaries, the tubes, the pelvic peritoneum, or the substance itself of the womb, oppose an invincible obstacle to the changes of structure and dimensions indispensable in these organs for the completion of gestation, of which I have collected pretty numerous examples.

Peu thought, and with some reason, that cripples are more liable to abortion than others—and he carried it to such an extent that he was unwilling to marry a young woman with one leg a little shorter than the other. De la Motte, who laughed at his *confère* on this occasion, was ignorant, without doubt, that a shortening of the lower extremities often coincides with some deformity of the pelvis.

Leucorrhœa, *hydrometry*, irritability; too great a degree of contractility; rigidity of the fibres and even of the vessels, and, if we may believe Haenschield and Loder, of the peritoneum of the uterus; and a laxity or atony of its neck, on which M. Désormeaux rationally insists, are also admitted among the number of the predisposing causes of abortion; but for the most part their action is far from being so evident as the preceding. The same may be said of a want of extensibility of the uterus, occasioned by a too great firmness of its fibres, a firmness on which many authors lay so much stress. According to their statements, abortion is to be feared because the womb does not yield with facility to the effort which tends to distend it. In this respect, their language, always similar to that of the

ancients, who supposed that the ovum acted mechanically upon the womb, would lead us to suppose that there is a sort of contest between the containing and the contained. However, nothing of the sort takes place: the womb enlarges in consequence of the unfolding of its fibres, and the affluxion of fluids into its vessels. The ovum ceases to grow as soon as the organ that contains it ceases to develop itself, and abortion may follow as a consequence thereof, but without our being able to accuse a distending power which it by no means possesses.*

B. Diseases of the ovum.—The foundation of an abortion, in a majority of cases, is laid in some peculiar disposition of the ovum itself, and I am astonished that authors have paid so little attention to this predisposing cause: like fruits that perish before they have attained their full growth, and separate and fall at the slightest shake of the branch on which they grow, the embryo or the fœtus in animals must become detached and soon afterwards expelled from the womb when it has ceased to live.

The alterations capable of bringing about the death of the fœtus are extremely numerous, and so much the more so, in proportion as the pregnancy is advanced. Since I began to pay regular attention to the subject of embryology, I have carefully observed one hundred and fifty products that had not gone beyond the term of three months; now I can assert that of this number at least one-half were diseased.

Sometimes the disease commences in the membranes; the chorion thickens, becomes opaque, and is covered with rugosities on its internal surface; the granulations on its external surface swell, and give birth to hydatids in bunches in the womb, and to the hydatiform mole, which Madame Boivin erroneously regards as a dependency on the amnios, &c.; the latter undergoes alterations that are nearly similar, is disorganized, or contracts adhesions with the surrounding parts; the placenta is not formed, or is irregularly developed, and becomes the seat of all sorts of degenerations.

Sometimes, and perhaps most frequently, the disease attacks the umbilical vesicle or its duct; in others it affects the cord or the embryo itself, and in this respect the forms and degrees of the alterations are exceedingly various.

Almost all the diseases to which the child is liable after birth may manifest themselves during its intra-uterine life. In an embryo of two months, I have seen adhesion of the whole length of the members to the trunk; I have seen ulcerous destruction of the head, belly, hand, &c., in subjects quite as young as the above mentioned; also, manifest alterations in the lungs, the liver, the peritoneum, and other parts of the body, as early as the third month; I have found the umbilical cord in a state of atrophy, and its vessels either quite or almost obliterated at every stage of its development. In several specimens, the umbilical

* M. Velpeau asserts here that the growth of the womb depends upon the affluxion of fluids into its vessels, and denies virtually that the growth of the ovum is the cause of that of the uterus. I do not pretend to know by what means the liquor amnii is formed; but it is evident that the development of the fœtus, and the increase in quantity of the liquor of the amnios, are the causes of the enlargement of the organ that contains them; that that organ enlarges because of their enlargement; and that it ceases to augment its capacity when they cease to increase in bulk.

The womb contracts soon after the rupture of the ovum and discharge of the waters. This contraction takes place at any period of pregnancy when the waters are broken. Is not this evidence enough to show, or rather prove that the womb depends for its increase, not upon a power inherent in its own tissues, but upon an antagonist force, to wit, the force which augments the bulk of the child, while it at the same time distends the membranes more and more by daily additions to the stock of liquor of the amnios?

I do not agree with M. Velpeau in the sentiment which he has expressed. I prefer to regard the ovum as an independent existence; which, like a parasite, draws its materials of subsistence from the surfaces to which it may be attached, and which compels those surfaces to augment *pari passu* with its own necessities as regards space, and surface for absorption. For an expression of my opinion on this subject, see the Philad. Pract. of Mid., p. 104.—M.

vesicle was hard, and, as it were, stony; in others, it was full of a clear limpid fluid; and in two cases it was not of a natural size, nor had it the other appearances that naturally belong to it. In some embryos, the head alone was atrophied and deformed; in others, the same state was observed in one or more of the limbs, the breast, or the belly; most commonly, the atrophy or the disorganization is general, and in some cases the embryo at last wholly disappears. In such instances, the amnios is most commonly destroyed also; I have many times found the ovum a mere sac, filled with an albuminous, limpid, and viscid fluid; I could almost believe that such ova, composed merely of the caduca and chorion, had never contained an embryo; that they might be compared to those eggs without germs that are laid by pullets that have never been fecundated by the cock; but as in several of them there were still to be found the traces of an amnios, an umbilical cord, or of the fœtus itself, it was necessary to renounce such an idea at once. Other observers have also met with most of the alterations which I have mentioned. M. Brachet has described a certain number of diseases of the placenta. It was covered with a false membrane in a case stated by Roberts; and infiltrated with pus in one of those collected by M. Cruveilhier. Many degenerations of the decidua have been pointed out by M. Dubreuil; and M. Lesauvage thinks that he has found this membrane in a state of suppuration. The chorion and the amnion have been seen by M. Hohl with traces of old inflammation. M. Lobstein describes, under the title of *kirronose*, a yellowish transformation of all the tissues of the fœtus, and M. Audry has collected a great number of examples of diseases experienced by the child during its intra-uterine life, some of which maladies have been also pointed out by M. Véron.

I have, besides, certain proof that most of the cases of monstrosity, even those which in our times are so complacently accounted for on the theory of an arrest in the process of evolution, are nothing more than the results of diseases in some part of the ovum; but I reserve the development of these assertions for another work. Let it suffice to remark, in this place, that the human embryo, a mere vegetable during the first months of pregnancy, is surrounded with too many causes of destruction to be able always to resist them successfully. Nothing ought to be more easy to ascertain than the disease and even the death of a being whose existence is so frail and precarious. Those which proceed from badly elaborated or diseased spermatic fluid, as from a father too young or too old, who is diseased, or worn out by an abuse of coition, are particularly exposed to them.

And finally, whenever the ovum is diseased to such an extent as to cause the death of the embryo, abortion is in some measure one of its necessary consequences. The organism then tends to free itself of it, as of a thorn, for example, but not because the blood which was originally destined for the fœtus becomes obliged to enter again into the mother's circulation.

§ 2. OCCASIONAL CAUSES.

The predisposing causes alone would very rarely fail to bring on the expulsion of the ovum; they in fact frequently do produce it, and in these cases the abortion is said to be *spontaneous*; however, it is almost always attributed to some accident, some particular circumstance.

Such, for example, among others, are yawning, pandiculation, the act of going to stool, of voiding urine, of coughing, great exertions, disappointments, joy or grief, the odor of the snuff of a candle, the impression of any strong odor whatever, an hysterical fit, epilepsy, *coitus*, dancing, sleeplessness, diarrhœa, tenesmus, and all the causes that might occasion uterine hemorrhage during pregnancy.

Mauriceau, who prohibits exercise and coition towards the end of pregnancy, and who had no children during forty-six years of married life, is opposed with sufficient malignity by Dionis. "For my part," says the latter, "whose wife has been pregnant twenty times, and who has been delivered safely and at term

of twenty children, I am persuaded that the caresses of the husband do no harm." It is then purely in a poetical sense that we must receive the verses of Tillet :—

Pour conserver le fruit de vos chastes plaisirs,
Réprimez désormais vos amoureux désirs—
Au feu qui vit en vous un autre feu peut nuire,
Et ce qu'Amour a fait, Amour peut le détruire.

Moreover, Aristotle accords to coition towards the close of pregnancy the property of rendering labor more easy.

I do not wish to be understood, however, that none of these causes may give rise to abortion; but only that, without the antecedent existence of one of the predisposing causes above enumerated, they would scarcely ever determine it, and that they most commonly are merely coincidences. The same may be said of the acute diseases of the woman, of asphyxia, of all sorts of inflammations, of crying, of singing, of the jolting of a carriage, of vomiting, of the use of certain medicines, of falls, blows, violent motion of what part of the body soever, of anything that might shake or shock the uterus. I cannot explain to myself, moreover, how a blow on the belly, unless of very great force, could injure so very severely the fœtus as in the case of the woman who hurt herself against the angle of a table, and who was delivered on the seventh day, as *Peu* says, of a child, the head of which was split into two halves down to the neck, each of which hung down upon the shoulders. I cannot either see what connection there is between the monstrosity of the head, observed by *M. Lecadre*, of a fœtus of some months, and the falling of the mother fifteen days before on the angle of a bucket.

It has been generally thought that these causes act by *detaching the placenta*: but, when it is remembered that the ovum fills the womb exactly, and is itself perfectly filled with the liquor amnii and fœtus, it is evident that motions impressed on the womb by external shocks are as incapable of separating the placenta from the womb, or the chorion from the amnios, as they would be to separate two bladders, one contained within the other, and the inner one full of fluid; the most active and imprudent women, those who give themselves up to the most violent exercises, do not, on that account, fail, most generally, to go their full time, as *De La Motte* says; while many others are found to abort in spite of the most minute precautions, and the most persevering attention. *Planque* has collected numerous cases in support of this assertion. A woman, says *Mauriceau*, who was seven months gone with child, in order to escape from her chamber, which was on fire, got out of a third story window; fear soon made her let go her hold, and she fell on the stones, and fractured her forearm, but her pregnancy was not disturbed. A young midwife mentioned by *Madame Lachapelle*, who was pregnant, and affected with deformed pelvis, threw herself from the top of a stair into a deep cellar, with a view to bring on abortion, and thereby avoid the Cæsarian operation. She died a few days afterwards of her wounds, but there was no abortion.

A. Medication.—Blood-letting, baths, emetics, purgatives, and emmenagogues also enjoy a great reputation among the women, as abortives, which happily is but little deserved. Diseases are daily met with in practice which require repeated bleedings, whether general or local, and for which the tartar emetic is administered, as well as drastic purgatives and other equally active substances, without the pregnancy seeming to suffer from them. *Mauriceau* speaks of a woman who was bled from the arm eighty-six times in one pregnancy, and who, notwithstanding, was at the end of it delivered of a fine large child; he mentions another who was bled from the foot ten times without experiencing any inconvenience. *De la Motte*, who has seen the most powerful evacuants produce gastritis, enteritis, peritonitis, and even death itself, without being followed by the expulsion of the ovum, mentions a woman who was bled eighty-seven times during the last months of pregnancy. *Levret* was not afraid even to recommend bleeding in the foot

during gestation. I had the care of a young person who, with a design of concealing the proofs of her dishonor, had produced a violent abdominal inflammation by taking medicines to promote abortion; she died on the eighth day without any symptom of abortion having appeared. I was consulted for another person, who had, with the same view, taken fifteen grains of tartarized antimony; it produced most violent efforts at vomiting, but the progress of the pregnancy was not interrupted. M. A. Hediard says that he has seen, in Sicily, an empiric give emetics at all periods of pregnancy without any inconvenience. The amputation of the leg, mentioned by M. Nicod, on a woman eight months advanced, did not hasten the time of delivery, and was also successful. I have elsewhere spoken of a woman who submitted to the vesico-vaginal section, by M. Philippe of Rheims, for a calculus, which weighed nine ounces, who did not know that she was pregnant, and who was delivered six months afterwards, without any accident. Baths, which Avicenna called execrable, and which Mauriceau also denounces, are employed constantly during the whole period of pregnancy with advantage.

It ought not, however, to be concluded from the above facts that blood-letting, particularly from the foot, or the application of leeches to the vulva, or that baths too frequently repeated, &c., can never be injurious to pregnant women; I merely wish to say that, except in case of some peculiar predisposition, these measures most commonly produce no effect, and that they may be had recourse to, if circumstances require them, just as if the woman were not pregnant.

B. *Special causes*.—Désormeaux has already pointed out the fact that abortion is frequently preceded by a state of irritative congestion of the uterus, a general febrile excitement, the train of symptoms which constitute the *molimen hemorrhagicum*. Very recently, Madame Lachapelle and M. Dugès have strongly insisted on this condition, towards which, in fact, almost all the predisposing and occasional causes of abortion tend previously to bringing into play the contractile powers of the womb; but it was an error to regard it as the primitive cause of almost all miscarriages; it is commonly only a secondary phenomenon, an effect of some other external or internal cause, and not a necessary result of any of them. However, there are some women who exhibit it in an evident manner at each menstrual period throughout the whole course of gestation; whence it follows, even, that abortion is never more frequent than at the menstrual period, and that most severe diseases may produce it. The cholera gave us a number of proofs of this in Paris, in 1832. It nearly always killed the fœtus. M. Magendie cites five examples. M. Lereboullet saw eight. M. Bouillaud, MM. Kerkhove, Elsässer, and Hill, quoted by M. Deubel, speak in the same way. I also saw a number of cases at La Pitié, and M. Moreau states others. If the fœtus dies so quickly in this fearful malady, it is not, as P. Dubois thinks, because the utero-placental circulation is quickly interrupted by the arrest of the general circulation, for M. Rullier has seen the circulation in a cholera patient kept up, whose child was putrid, which resulted from a combination of circumstances which it is not worth while to advert to at this moment.

C. *Periodical causes*.—Periodical abortion, or that which in the same woman recurs at nearly the same period from conception, is one which appears to be most evidently connected with a menstrual or spontaneous *molimen*. M. Stoltz knew of two women who had aborted in this way seven times. It may, however, also depend on a special state of the womb, either congenital or acquired; for example, upon the womb being incapable of distension beyond a certain degree. On this point the influence of habit or hereditary constitution is commonly referred to; the cases of many women are cited whose mothers were subject to abortion, and who were never able to carry a fœtus to full term. Observation has proved that miscarriage is so much the more to be apprehended in proportion as the individual has been previously subject to it.

Schulz speaks of a woman who aborted twenty-two times at three months; Schurigius cites one who always reached the eighth month, and a second who

only attained her full term in her twelfth pregnancy. A person who had had eight abortions at three months at length reached the ninth month, as Burton says, in consequence of repeated small bleedings. The wife of an ex-pharmacien of Paris has already had five before the fourth month. The wife of one of our *confères* is in the same way; and I have been called to another woman who has had five mishaps since her first child, who is only two years of age. The case is mentioned of a young girl who, having by criminal methods several times procured abortion of her fetuses, could never carry one to the full term after she became a married woman.

D. Mechanical causes.—The *mechanical* causes, or certain *manœuvres* recommended by some authors, in cases of deformity of the pelvis, and which, in the midst of our refined society, are also employed by degraded wretches not less criminal than the unnatural women who are not ashamed to submit to their disgusting ministrations, must be arranged amongst the same class with emmenagogues and drastic purgatives. Those who make use of them most frequently fail of attaining their object, and succeed only in seriously injuring the womb. I once prescribed for a female, in whom such attempts had brought on a flooding which carried her to the verge of the grave; she suffered horribly from pain in the interior of the pelvis for two months, notwithstanding which, the abortion did not take place, and she is now a prey to a large ulcer of the neck of the womb. I opened the body of an unhappy creature who suffered from the like attempts, which did not succeed any better than the one above mentioned. M. Girard, of Lyons, mentions a similar instance. Very recently, also (October, 1828), a young woman who became pregnant against her wishes, succeeded by such manœuvres in producing only an organic lesion of the uterus, which, after frightful sufferings, led her to the commission of suicide. It is a crime so common in Paris, that I have been called, in two months, to four women who had committed it. One died of peritonitis; another (in June, 1834) actually had a cancer. The third had a discharge which nothing could cure. The fourth alone recovered her former health.

ART. III.—REACTION.

§ 1. SIGNS.

After protracted disease, and within the first two or three months, the expulsion of the ovum is often effected without being accompanied by any particular symptoms, and does not sensibly differ from what takes place at a somewhat painful menstrual period. But, at a more advanced stage, it can only give rise to the ordinary phenomena of a natural labor; yet it is most commonly preceded by lowness of spirits, a general depression, by lipothymia, syncope, a feeling of coldness in the epigastrium, palpitations, paleness, fetid breath, flaccidity of the breasts, and a major part of the rational signs indicative of the death of the fœtus. Ordinarily, the woman at first, for one or more days, has rigors, horripilation, a hot skin, thirst, want of appetite, increased movements of the heart and arteries, a feeling of weight in the pelvis, about the fundament or loins, and a general lassitude of the limbs, as if threatened with some severe disease; next appear hemorrhage, accompanied with pain of greater or less severity, and all the symptoms of real labor; but, amongst all these signs, scarcely any, saving hemorrhage*

* A patient under my care lost in the fourth month, by uterine hemorrhage, more than twenty ounces of blood in the course of one day and a half, notwithstanding which, she continued to the end of the ninth month in tolerable health, and then gave birth to a very healthy child. It is certainly a very rare case to meet with a patient who does not miscarry after losing four or five ounces of blood as early as the end of the fourth month.

I have now under my care a patient in the sixth month, who has had several very considerable attacks of hemorrhage, and who has not been without more or less of a show for two months past: the placenta is not near the cervix uteri, and the child, as learned by auscultation, is in good health.—M.

and pain, afford any certainty previously to the dilatation of the cervix, and the presence of a portion of the ovum in the upper part of the vagina.

A. *Hemorrhage* itself is not invariably followed by abortion, as is proved by the observations of Mauriceau, Raymond, Boër, &c.; those of Puzos, especially. Flamant, MM. Nægele, Stoltz, and Deubel have also seen profuse discharges of blood from the uterus without being followed by abortion. Nevertheless, there is good reason to fear it when that symptom once takes place.

B. As to the *pains*, it is important that they should not be confounded with the colic, or with those uterine pains that are also occasionally met with during menstruation; for this end, reference should be made to the signs indicated in regard to the pains of labor.

C. The discharge of a certain quantity of brownish matter, or of serosity, the softening of the cervix, the rupture of the membranes, the formation of the *bag of waters*, with pains extending from the navel towards the excavation, constitute the most conclusive signs of miscarriage; nevertheless, M. Désormeaux has known all these signs to be present after a fall, and yet abortion did not ensue. M. Gorgeret says that a woman, five months advanced, received blows on her abdomen, and that a discharge followed. The neck of the uterus dilated, and an abortion appeared imminent, and yet the delivery took place in its natural order at full term.

In another, who had been thrown down and trampled under foot, a hemorrhage, pains in the hypogastrium, dilatation of the neck, and a discharge of water soon appeared, and the fœtus ceased to move at the seventh month; it, however, came away living at full term. M. Morlanne relates the case of a woman who was not delivered until six weeks after the discharge of the waters.

In a case observed by M. Manoury, the discharge of two ounces of water did not prevent the woman from going to full term, and from being delivered of a child in full health. M. Levêque Lassource gives a similar case. There has also been recently mentioned the case of a woman six months gone, in which the bag of waters was formed, and then ruptured, so that the arm of the child engaged in the vagina; after which the labor was arrested, the fœtus returned to its proper position, and the pregnancy proceeded in its natural course! Hayne has witnessed more than can be credited, that is, that a child, the head of which had already escaped, again returned into the womb. Indeed, such facts do not appear possible, except in rupture of the womb or vagina.

The *fluid* that escapes from the cervix may besides come from an hydatid cyst, or from between the membranes; in such a case, it is very evident that the pregnancy might not be necessarily disturbed; it may also proceed, in double pregnancy, from the rupture of one ovum, while the other may not suffer the least alteration; but, with the exception of these anomalies, it appears evident that the rupture of the membranes, followed by the discharge of the waters, positively indicates miscarriage, or at least the death of the fœtus, if it is not soon expelled.

D. The *child, having ceased to live*, is generally soon thrown out by the uterus; but, in some cases, its expulsion does not take place for a pretty considerable period. I have seen it not take place until the twenty-eighth day in a woman who was seven months with child. In another woman, the pregnancy, which was ascertained by *ballotement* and active motion of the fœtus, suddenly stopped at six months; all the signs of the death of the child supervened; the belly gradually lost one-half of its size. From this period eight months elapsed; the cervix remained closed, and nothing indicated that miscarriage was about to take place soon. M. Prout gave me an opportunity of seeing a fœtus of from three to four months, which was not discharged for five months after the first symptoms of abortion, and numerous authors have mentioned similar instances.

M. Ansiaux, for example, speaks of a fœtus which died at four months, and which was not expelled until the full term. Lecieux was then wrong in main-

taining that the ovum would not remain in the womb for more than from five to twenty days. The whole product could indeed be transformed into a yellowish and fatty mass, with the bony parts. M. Ozanam met with a case which he described as a lipoma of the uterus, which body weighed six pounds. It is a peculiarity which occurs quite often among sheep.

M. Carus even affirms, as does M. Huzard, that, as regards sheep, the young may become, 1st. Shriveled, and covered with a calcareous crust; 2d. That it may be absorbed; and, 3d. That it may be decomposed.

He states the case of a woman who had an incomplete labor in 1814, and who again became pregnant in 1820; the first foetus remaining for five years in the uterus.

I saw, in April, 1834, with M. Vasseur, a woman who continued in this condition since the fall of 1833, and who suffered during this time severe accidents. I saw another, with MM. Puzin and Moreau, who died at the end of three months without discharging the altered foetus. In a case communicated by M. Vassal, the child was reduced to a skeleton.

Barbant says that a child which died at about four months was not delivered until the eighth. In another case, the child was not delivered until five months after its death. In the two cases, the membranes were thickened and very solid, and contained nothing but water.

If the membranes are not broken, and the air does not get access to their interior, the foetus may be preserved without change for several months, or even several years, which has given rise, I presume, to the supposed pregnancies of fifteen, twenty, or thirty months' duration, &c., that are spoken of in the scientific collections. This occurrence is met with, particularly in compound pregnancy: one of the foetuses dies at two or three months; the other continues to grow; and at the lying-in, the practitioner is astonished to receive both a full-grown child and an abortion. I am in possession of a great number of facts of this sort; MM. Bouvier and Colombus have each communicated one to me, and many of the instances of superfetation that have been most insisted on are nothing more than such as these. The membranes of the one may become a mole; and the second may not die until the third or fourth month; and the whole may be thrown off much later, as we see by the observations of M. Monclar.

At other times, it is decomposed, putrefies, and passes into the state of adipocire. Wright states a case of this kind. The foetus became putrid, three months afterwards; bones were detected in the uterus, which were removed; and everything led to the belief that the pregnancy was double. In the first months, it may become atrophied, and when the ovum is thrown off, only exhibit the dimensions of an embryo of four or five weeks, although the woman was three or four months gone. It may also dissolve in the waters, and then the ovum is found to be transformed into a real mole. If the membranes give way, the foetus generally escapes first, and the membranes follow soon afterwards. M. Trelat, however, has seen a case in which the foetus was not discharged until twelve days after the expulsion of its involucre.

Although the foetus may no longer be in the womb, its coverings may still stick there by means of some adhesion. In an abortion which took place at five months, Thornton said that the placenta was not expelled until the ninth month, and that it weighed eight ounces. It did not escape until about the end of a month, but without alteration, in the case of a woman mentioned by Ramsbotham. The appendages, besides, continue to live and grow. The caducous membrane soon acquires a considerable degree of thickness; the amnios disappears; the cavity of the chorion by degrees contracts, and the mass comes at last to be a reddish fleshy tumor, in the centre of which is most commonly, but not always, found a small serous cavity. In this way are formed most of the *fleshy moles* or *moles of generation*. The placenta may continue to grow alone, or it becomes infiltrated, and when at last it is expelled, it exhibits no resemblance to its ori-

ginal form or nature. All the alterations of the ovum which I have before pointed out, in speaking of abortions, may be regarded as the origination of moles. I have observed so many varieties of them that it would require a volume to describe them all. The different products of conception shown in the ten first plates of M. Granville, being evidently unnatural, might have been classed among moles, if their expulsion had been retarded a few months (see the article on moles).

Sometimes the ovum comes away whole. Indeed, this is most frequently the case until the end of the second month. But after this, its size does not admit of its being so expelled, in a majority of instances; and so much the less, as the gestation is at a more advanced stage. Diemberbroeck has, however, seen the contrary in a pregnancy, which he considered at term; and I saw an ovum of full six months expelled at the *Hospital de Perfectionnement*, which was not in the least broken. M. Larrey sent me another of five months and a half, which was also quite whole. M. Eryaud reports a similar case. M. Stoltz has seen the same thing at five months; Siebold has seen the same thing at five months; and M. Marson bears witness to a like case at eight months of pregnancy. In the first months, instead of all of its appendages, the fetus brings away sometimes the amnios alone. I have collected of this variety many specimens. M. Ricord procured one for me in October, 1833. The ovule is also complete, but is deprived of the caduca. To the facts of this kind which I possess already, I will add two which were given me in 1833; one by M. Guillon, the other by M. Lemercier.

ART. IV.—PROGNOSIS.

A miscarriage is generally more dangerous than a labor at term, and those authors have erred who find fault with Hippocrates for having uttered this opinion. The former is a disease, while the latter is only the termination of a natural function. But, to speak correctly, abortion is sometimes not such a serious matter in itself considered, but because the causes which induce it and the accidents which accompany it generally constitute important diseases; because the pregnancy, which is terminated by it, has recalled to the genital organs the germ of affections whose existence was not suspected, or which perhaps would have never reappeared but for it. The prognosis ought, therefore, to vary according to circumstances. If it appears to draw in its train a variety of nervous affections, pains in the hypogastrium, chronic inflammation of the womb, ulcers, degenerations, and all sorts of organic lesions, it frequently is so because these alterations existed previously to the miscarriage itself; excepting always those cases of abortion produced by the direct agency of mechanical causes.

The least dangerous abortion is that which is determined by a disease of the ovum, and the most serious is that which a violent occasional cause, unaided by any predisposing one, has given birth to; moreover, all other things being equal, a spontaneous abortion is less to be dreaded than a forced one, and, in general, so much the less in proportion as it is effected with gentleness: the danger, which for the woman is greater in proportion to the degree of advancement of the pregnancy, is, for the fetus, the same at all stages of the gestation. One of the most formidable, according to Mauriceau, is that which occurs during an acute disease. When we see such symptoms occurring in a woman affected with severe fever, or visceral inflammation, or erysipelas of the face, or small-pox, or measles, if towards the close of these a convalescence should set in we have reason to be alarmed, as the death of the mother is a frequent consequence. Of this I have witnessed the sad proof twice at La Pitié, in 1833. In one of them, the abortion took place during the desquamation of an erysipelas *ambulant*; in the other, the patient had been sent from the surgical to the medical ward to be treated for subcutaneous abscesses, the consequence of small-pox. M. Serres has informed me that, in more than twenty cases of abortion, occurring during the small-pox, he had never seen a woman recover.

Where the cervix is naturally soft and relaxed, while the rest of the womb retains its ordinary density, the miscarriage is both easier and less serious to the woman than in the opposite circumstances; when produced by a very decided *molimen*, if there are no complications, it may terminate as favorably as the most simple case of parturition; but, as this hemorrhagic effort is, most frequently, merely the first degree or the symptom of a more or less extensive inflammation, there is reason to fear, especially if fever attends it, either a metritis, an acute peritonitis, or some other phlegmasia equally dangerous. Some authors have contended that abortion may have its advantages, as, for example, to render menstruation regular, or restore fecundity; but it is evident, from her miscarrying, that a woman is not sterile; and besides, if the menses sometimes resume their original type after an abortion, they would have done so with more certainty after a complete pregnancy.

I can conceive of only one case in which abortion could be of advantage by being frequently repeated, and that is where the womb is not sufficiently permeable, or too dense to dilate in proportion to the wants of the ovum; then one miscarriage must necessarily diminish this abnormal rigidity a little; a second one diminishes it still more; and finally, a third or a fourth may completely overcome it so as at last to render it possible for the woman to carry the fetus to full term.

ART. V.—TREATMENT.

The practitioner should turn his attention to the prevention of miscarriage, for, when it has once commenced, all he has to do is to hasten its termination.

The *preservative treatment* must necessarily vary according to the nature of the determining causes we have to remove or combat: if the woman is irritable and very sensitive, we must do all in our power to protect her from moral commotions; she should be kept out of large cities; traveling should be recommended to her for change of scene, &c. Those who are weakly and lymphatic should follow an analeptic regimen, and keep quiet, or at least engage only in agreeable exercise: in some cases a tonic medicine may be administered. M. Colson has remarked that, among venereal patients, mercury favored abortions. An English observer, Russel, maintains, on the contrary, as do also Beatty, Chastaingt, and Tourel, that it is an excellent means of preventing it, especially between the fifth and eighth month. Russel says that he never experienced any injury in giving women, from time to time, commencing at the third month, seven or eight grains of blue mass a day; but I fear that his assertions would not meet with much belief among practitioners. Should there be a disease of the uterus or of some other organ, its nature should be carefully inquired into, so as to apply the suitable remedy. When signs of plethora or of congestion are present, blood is to be taken from the arm, which may be repeated once or oftener, if circumstances require it, particularly in women in whom each menstrual period is marked by an evident *molimen*.

Bleeding is certainly one of the best means of preventing abortion. Dionis recommended it to be practiced eight hours before the second menstrual period. It was the chief remedy, says Stoll, in the epidemic of abortions which prevailed in Vienna, in 1778 and 1779. But it would be dangerous to conclude, with the vulgar, that it is useful in all pregnancies indiscriminately. Where no particular circumstance calls for it, it may be injurious to pregnant women as well as to other persons, and too much fault cannot be found with the habit that some fall into of being bled once or twice during their pregnancy, without knowing whether there is any real need for it or not.*

* Dr. Physick told me that he was accustomed to order an anodyne enema every night at bedtime for such of his patients as were prone to abortion. Fifty drops of laudanum and a

As soon as the signs of abortion become manifest, we ought to act in the manner I shall point out in the article on uterine hemorrhages; in general, the most absolute rest, horizontal posture, cold acidulous drinks, external revulsives, applications of ice itself, and antispasmodics and composing medicines, if there are any agitation and tendency to convulsions, will be successively tried; blood-letting is still the most powerful resource to be made use of; but, nevertheless, it is not to be employed without reserve and caution, for as it does not always prevent miscarriage, it is liable to be charged with the production of an accident which it was impossible for it to avert. Ruitz and Chauffard thought that they obtained marked success in a similar case from the extract of rhatany. Bathing the feet and the hands, and the general bath, should be avoided while there is any hope remaining of being able to avoid the expulsion of the ovum; otherwise they may be used with advantage.

Where the hemorrhage is of an alarming character, we have a precious resource in the *tampon*, which has been too much neglected by the moderns; it not only often arrests flooding, but, besides this, it does not always hinder pregnancy from going to its full term, as noticed by Gallandat, M. Désormeaux, and Madame Lachapelle. Denman, Kok, and Kluyskens have spoken highly of its employment in such circumstances; and I, for my part, have nothing to say except what is wholly in favor of its employment. Perhaps also the *ergot* might be efficacious in such cases; but, as it favors the expulsion of the ovum, it would not be prudent to make use of it until after having tried all other means. Finally, when abortion is once decided, it requires the same care as hemorrhages, properly so called, or as parturition.

To promote the expulsion of the product of conception, when the impossibility of retaining it in the womb is once ascertained, we continue the use of the same means; if the woman is strong, we recur to blood-letting; but rest and the horizontal posture are less indispensable; and baths and ergot may be administered without fear. Opium administered internally if the pains are very strong; sedative ointments, or the ointment of belladonna, applied to the cervix, if that part is painful, and in a state of spasmodic constriction; and emollient injections into the vagina, may be of use in some cases. If the ovum is too long in passing through the cervix, it may be of advantage to insert the finger into that part, and thus assist in the expulsion. But we should not determine to remove it, although Mauriceau says otherwise, by seizing it with the *pincers à faux germe* of Levret, *l'extenseur*, or kind of *litholabe*, devised by Burton, the placental hook of Dewees, or by any other instrument, as the flexible hook of M. Dugès, unless there should be a pressing necessity to deliver the woman at once, for we run the risk of not getting the whole away, and of being unable subsequently to reach the remaining portions which could not be seized at first.

After the escape of the fœtus, everything returns to its natural state, just as it does after a lying-in. The deliverance of the placenta, the milk fever, and the *sequelæ* of the labor require the same cares, particularly if the pregnancy has exceeded the fourth month, and even in the first months, when the ovum comes away whole; but, if the membranes are left behind after the expulsion of the fœtus or embryo, as they compose the chief portion of the product, the consequences do not always terminate at once; in such cases, we can never feel secure until after their complete expulsion, and it would be wrong not to extract them as soon as it is possible to seize them in the vagina.

wineglassful of flaxseed tea were thrown into the rectum regularly at night, with a view to obviate any too great tendency to uterine contraction. I have in several instances happily succeeded in conducting the woman to full term by this method of treatment; I have also sometimes found it to fail.—M.

CHAPTER II.

MOLES.

THERE is no term in science more indefinite than *mole*. In tracing its derivation to the Persian word *molin*, which signifies flesh, Lamzwerde has not rendered its signification clear. It is used to designate all abnormal products which occur without an obvious alteration of the uterine cavity. Clots of decomposed blood, false membranes, remains of the fœtus or placenta, most of the transformations which the ovum undergoes, have all been thus characterized. We see also that Guillemeau already admits a true or fleshy, and a false or *membranous* mole; while, since his time, polypous, sanguine, embryonic, non-embryonic, and hydatid moles, &c., have been so classed. We may perceive, from this confusion of terms, that, according to some, a mole should always be the result of conception, and that, according to others, it can occur without any previous fecundation. Those membranous concretions which are deposited in the uterus, during the menstrual period in some women, and which Hippocrates calls *fleshy menses*, are evidently possible in young girls, although copulation is most usually the cause. It is the same case with the fibrinous bodies and the masses of blood which Granville has figured in the eleventh and twelfth plates of his work. Hydatids, and all bodies which are characterized by a true tissue, are, on the contrary, the degenerated products of true pregnancies. There is not any odd figure which one or the other of the two kinds of mole may not simulate. Monkeys, toads, mice, and all the different animals with which it pleased our credulous ancestors to believe that women had to do, belong mostly to the first class. The little dog without hair, of which Eliza Bombay was delivered, and the history of which Vander-Wiel had no fear of giving, is an example. The mole which this author called *virginale* was, on the contrary, a real product of conception. It is the same with gooseberries, grapes, single, or in bunches, and with many other fruits, which different persons say that they have seen escape from the genital organs, and which are only after all varieties of the hydatid moles, or an altered ovum.

The first variety of mole, or that independent of conception, is very rare. We may observe that it is never positively organized. It is only thickened blood, or an exudation of lymph which chiefly forms it, and which cannot become organized; but in this case adhesions may be established between the womb and the pathological production, and then it becomes a disease which no one classes among moles. In the second variety, on the contrary, a close examination always detects some remains of natural tissue, and is a pathological condition of the ovum manifested either on the part of the fœtus or its appendages. If its expulsion is delayed for any length of time, there results in the first case some monstrosity, and in the second, the variety of mole of generation.

This mole is then characterized by a degeneration more or less complete of the embryo and cord. The five altered ovules described by Diemerbroeck may be regarded as moles at the time of birth. All the ovules or ova solely filled with a glairy matter, whether sanguine or serous, are of the same kind. Whether the amnion remains or is destroyed, whether the chorion continues intact or alters, whether the decidua forms a part or not, if the membranes rupture, the cavity of

the ovum becomes empty and soon presents nothing more than a smooth surface, and may even after a time disappear altogether. The moles are often, also, if not always, as M. Meissner seems to admit, veritable hypertrophies of the ovum. Blood which may be deposited between the *caduca* and chorion, or in the thickness of the *caduca*, may cause the mole to take on the most varied forms, and to acquire a considerable volume. Apoplexy, scirrhus and steatomatous tumors, purulent deposits in the placenta, and the livid or yellowish projections which I have often observed on the external face of the chorion, may have the same effect. The hydatiform mole is not less common than the others. Valisnieri, who ascribes it to an alteration of the lymphatics; Ruysch, who detects its origin in a dilatation of glands; Albinus, who seems to attach it to a dilatation of vessels; Reuss, who explains it by the *valvules* which he admits in the vascular canals of the placenta, are only mistaken in its etiology, because they do not understand the tufts or velvet-like work of the chorion. I first demonstrated that this velvety structure of the chorion is neither vascular nor full of little canals, and that its filaments are naturally in knots. The observations and the figures given by Wrisberg, Sandiford, Leroy, and others, which I have myself collected, soon allowed me to establish that hydatids of the womb are nothing more than an hypertrophy or morbid expansion of these knots or granulations. This opinion has also received the assent of M. Cruveilhier, having been adopted by Désormeaux, to whom I have shown many specimens of my collection, and by Madame Boivin, who at first regarded it as an alteration of the amnion. Examples of similar moles are extremely numerous in the science. Peu relates many, and cites a woman who discharged plates full of hydatids. Portal, de Vega, Vallériola, and Van-der-Wiel, who gives a plate, have each observed the same thing. Burton says that in two cases he found it necessary to extract them with the hand. In the case of a patient of whom Saviard speaks, the hemorrhage did not cease until a bundle of hydatids were expelled. Haller maintains that hydatids are dependent on a conception. In a case observed by Burns, the fœtus was expelled at three months, but the appendages were retained and became transformed into hydatids. A subsequent pregnancy took place, and the whole, hydatids and ovum, escaped at the end of four months. In M. Debourge's case, the mole, which was enormous, simulated a pregnancy at term, and the hydatids composing it were evacuated in masses at different times. Mr. Epps thought, on one occasion, that he had a case of hemorrhage from placenta prævia to manage, but it proved to be a mass of hydatids of considerable size. M. Thuillier cites a very similar case, from which it follows that the different kinds of these productions are very various, and that they may acquire a remarkable volume after the death, or breaking down, or expulsion of the fœtus from the womb. The isolated hydatids with which Portal, Diemerbroeck, and Percy have met are often nothing more than vesicles accidentally detached from a bundle of them. It may be possible, however, that an umbilical vesicle, or some enlargement on the cord, or an ovule reduced to the amnion or chorion and enclosed in another sac, or that some unknown alteration in the interior of the ovum, may sometimes constitute them.

The hydatid mole is not the only one which can maintain itself for a long time in the womb. Riveux says that, in a woman seventy-seven years old, who died of putrid fever, was found a mole weighing twenty ounces, reddish on the outside, and whitish and cartilaginous within. Paré mentions one which was as large as the two fists, grumous, containing cartilages, &c., which was not discharged until the end of seventeen years.

In conclusion, it is impossible to distinguish a *mole*, no matter of what kind, from a real pregnancy, or from a disease of the womb before labor comes on. The attentions which this pathological condition require are, moreover, the same which are necessary in abortion. I will conclude this chapter, in which I have

not entered into all the details, by stating that there was only an expulsion of the false membrane during menstruation and the product of an alternate pregnancy, instead of a succession of moles, from the patient whose curious case M. Salemi has published. In this case, we see indeed—1st. The expulsion of a false membrane. 2d. Two deliveries. 3d. A difficult abortion. 4th. A hemorrhage arrested by a cold hand-bath. 5th. A discharge of a new sac. 6th. At the end of the third month, a similar product, which it became necessary to extract. If it becomes necessary to assist in their expulsion, we may proceed as in abortion. M. Bricheteau says that he has used ergot with advantage.

PART II.

OF LABOR.

It has been recommended, at different times, to replace the word *accouchement*, derived from *ad* and *cubare*, placed near to, by that of parturition, derived from *partus*, *partio*, *parturire*, or by that of child-birth, *puerperium*; but, as custom cannot give place to a false or erroneous acceptance, these different substitutes have not been adopted.

Definitions.—Levret has defined labor as “a natural operation, truly mechanical, and susceptible of geometrical demonstration.” A definition which V. Solingen has since reproduced in the same terms.

Astruc, imbued with the same notions, thought he could reduce the art of delivery to the solution of the following problem: “An extensible cavity of a certain capacity being given, to extract therefrom a flexible body of a given length and size, through an opening which is dilatable to a certain extent.” As if it were a matter of indifference whether the fœtus should be extracted artificially, or whether its expulsion should be left to the powers of nature!

In asserting “that labor is nothing more than the passing of the child and its appendages from the womb,” M. Maygrier also employs a faulty definition, inasmuch as it does not express the action which occasions this passage.

Neither is it correct to say, with Madame Boivin, “that labor is the emission, expulsion, or excretion of a living child at full term, together with its appendages, occasioned by the contraction of the uterus, and the disposition of the genital organs of the mother.” This definition, in the first place, is inconvenient, in being too long; and then it comprises only natural labors, and does not embrace either precocious or retarded births, nor cases in which the child is dead *in utero*.

According to M. Désormeaux, who has properly felt the insufficiency of the principles of Levret, Astruc, and Baudelocque, “labor is a function which consists in the expulsion of a fœtus from the womb, in which it grew during the whole time of gestation.” By substituting for the words operation and escape, those of *function* and *expulsion*, this able practitioner has rendered his definition incomparably better than any that existed before. According to Mr. Burns, “it is the expulsive effort, on the part of the uterus, for the delivery of a child capable of living after birth.”

However, were it of any great consequence in practice to adopt one definition rather than another, I should prefer simply to say, *that labor is a function that consists in the expulsion of the ovum from the mother's organs.*

Classification.—Many plans have been proposed for the classification of labors. Mauriceau, adopting the sentiment of Hippocrates, calls those natural labors in which the child's head presents, and which terminates without assistance. All others have been called unnatural by Paulus Egineta, the ancients, Guillemeau himself, Dionis, Portal, and Deleurye. The *accouchement* is natural, says P. Egineta, if the child presents either the head or feet. In all other presentations, it is unnatural. Mercatus calls it dangerous or unnatural when the fœtus presents neither the head nor feet. Peu makes use of the word *laborious* instead of *preternatural*. De la Motte describes them as natural, non-natural, preternatural,

and untoward. Soon afterwards were admitted, under the title of *natural labors*, all those in which the head or the breech presented; under that of *laborious*, those which, notwithstanding the favorable position of the fœtus, are so long protracted that we are obliged to assist them; all those were called *preternatural* in which neither the head nor the breech presented to the strait. Smellie modified this classification, and said, "I call that a natural labor in which the head presents, and the woman is delivered by her pains and the assistance commonly given: but should the case be so tedious and lingering that we are obliged to use extraordinary force in stretching the parts, extracting with the forceps, or (to save the mother's life) in opening the head and delivering with the crotchet, I distinguish it by the appellation of laborious: and in the preternatural, comprehend all those cases in which the child is brought by the feet or the body delivered before the head." Smellie's division, taught at the same time by Astruc, adopted by Solayrès, and propagated by Baudelocque, is still followed by a majority of French accoucheurs.

There are few authors, however, who have not attempted to show its incorrectness, and readily succeeded in doing so; but as those which have been proposed as substitutes are not less inconvenient, it has preserved at least the advantage of being more generally known than any other.

It would be quite as well to follow it, for example, as with Millot to admit of a division into natural labors, properly so called (the child presenting the head); irregular natural labors (the child coming breech foremost); artificial labors (those which require the employment of the hand, either alone, or armed with some instrument, but without any necessity for dividing the mother's parts); preternatural labors (where it is necessary to make an artificial passage for the child): or, with M. Gardien, to admit of mixed labors (where the position of the fœtus only requires to be changed): or, with MM. Maygrier and Gardien, and Madame Boivin, to make a division of artificial labors (preternatural and laborious labors): with M. Capuron, mechanical labors (where recourse is had to instruments), or manual labors (the preternatural of Baudelocque): or to make, along with Denman, a fourth class, under the title of anomalous labors: or, with Burns, to establish seven classes—1. Natural labor; 2. Premature labor; 3. Preternatural labor; 4. Tedious labor; 5. Instrumental labor; 6. Impracticable labor; 7. Complicated labor. In fact these accoucheurs have only changed the acceptation of the terms they employ, or the new ones they propose are still more faulty than the old ones, and I cannot perceive that the modifications adopted by Hermann of Berne, and Dewees of Philadelphia, obviate this inconvenience. Besides, there is no such thing as a labor purely artificial, and the student cannot at a first glance understand the difference between a manual and mechanical labor any better than that between preternatural and laborious labors.

The division that I prefer approaches very nearly to the one indicated by Mauriceau. All labors that terminate under the sole influence of the powers of the organism, after the manner of M. Lebreton, I call *spontaneous*, fortunate or simple; those, on the contrary, that present difficulties of what nature soever, and which in any way endanger the life or the health of the mother or of the child, I call *difficult*, troublesome, or complicated; and each of these great classes may in turn be divided into orders, genera, species, and varieties, if the wants of the science call for it.

CHAPTER I.

OF LABOR IN GENERAL.

LABOR is said to be *at term* or *timely*, if it takes place at the ninth month of pregnancy; *tardy* or *retarded*, if the pregnancy extends beyond this period; *advanced*, *hastened*, *precocious*, or *premature*, if it takes place between the seventh and the ninth months; and it is called *miscarriage* or *abortion* if it occur previously to the seventh month. As it is in some sort produced by the same causes, and accompanied with the same phenomena in all cases, I shall first examine it in a general manner before entering into the details upon each class in particular.

SECT. I.—CAUSES.

It is common to divide the causes of labor into proximate and remote, or also into occasional or determining, and efficient or immediate.

ART. I.—EFFICIENT CAUSES.

The efficient causes are those which *effect*, or, properly speaking, *constitute* labor; they have greatly occupied the attention of physiologists and accoucheurs in all ages; they have by turns been attributed to the fœtus, the womb, the abdominal muscles, the diaphragm, and sometimes to all these parts together. Hippocrates and most of the ancients thought that at the end of gestation the fœtus tears the membranes, extends itself like a spring, and pushes with its feet and breech against the fundus of the uterus, while with its head it presses upon the cervix so as to dilate it, pass through it, and then escape from the genital organs. This opinion, which Harvey professed when he said that in its exit the fœtus acts with its feet, and which still prevails amongst the vulgar, was founded upon what takes place in birds, where the little chick, for example, breaks the surrounding shell with its beak, when it reaches the period of hatching; upon the circumstance that children that die while in the womb are born with more difficulty than those who are strong and vigorous; and, lastly, on the fact that children have been frequently known to escape spontaneously from the womb after the death of the mother.

Nevertheless, it has never been generally admitted that the fœtus is the sole agent, the sole efficient cause of delivery. Indeed, the wisest authors believed that it played an important part in this grand function; but that it could not come forth without calling other powers to its aid.

During the process of its birth, the fœtus does not exert in any way an active power. The analogy which it was attempted to trace between child-birth and the hatching of a chick cannot withstand the very weakest objection: in most cases, the death of the child does not affect its expulsion at all; besides, the slowness of the labor in such a case is explained by the fact that the fœtus when dead is flaccid, and cannot present to the womb the same firm resistance as if it were alive; that, if putrefaction have commenced, the irritability and contractility of the womb often receive a mischievous influence therefrom, and to a greater or

less extent lose their natural vivacity; finally, that the vitality of the foetus being generally proportioned to that of the organ in which it is contained, it is quite natural that the labor should be more prompt and easy where the child is robust and healthy than where it is feeble or diseased.

Those labors that sometimes take place after the death of the woman, and form the principal argument of the partisans of the ancient hypothesis, furnish, on the contrary, a decisive proof in support of the opposite doctrine. In these cases, the children have always been found lifeless between the mother's legs, as in the case of which Harvey speaks. It might even be affirmed that they died first. They escape from the womb by means of a power wholly extrinsic to them. After death, the organs of the *life of relation*, especially the muscles, become relaxed, while those of vegetative life continue for some time in possession of their contractility; sometimes the abdomen becomes filled with gas with surprising rapidity; so that, if the labor is far advanced when the woman dies, it is not a surprising matter that the uterus, being mechanically compressed from without, meeting with no further resistance from the perineum, and still retaining the power of contraction, is enabled completely to expel the ovum without any necessary participation on the part of the foetus. This was evidently the nature of the case with the woman named Homer, who gave birth to a dead child thirty-four hours after she had herself ceased to exist. In stating that Scipio and Manlius were born in this way, Bartholin and Diemerbroeck have only yielded to their natural partiality for the fabulous. The foetus was dead in two somewhat similar cases related by Salmuth, Bartholin, Planque, and Schenck.

In the second place, observation has demonstrated that delivery takes place pretty nearly in the same manner, whatever be the period at which it happens. Now, where abortion takes place in the first half of the period of utero-gestation, it is evidently impossible for the foetus to make the least effort to escape from the organs. How can so delicate a creature be supposed capable of dilating an opening, through which the most vigorous man might vainly essay to pass his hand? Who does not know that until the fourth or fifth month it is scarcely capable of making a few motions; that it is rarely strong enough to be born alive, or at least to live over a few minutes after birth? Were it to act of itself in labor, it would commence by rupturing the membranes; however, the bag of waters is not broken until the last stage of labor: in some cases, it does not break at all, and the ovum comes away whole; besides, the very moment when the bag of membranes presses upon the cervix in order to engage in it, is the time when the foetus retires from it, instead of pressing upon it. If it be true that the birth of a dead or very feeble child is generally effected more slowly than that of a foetus that is strong and full of vigor, it is also true that the difference between the birth of a living and dead one is not sensible. In all cases, the after-birth comes away at last, and we are compelled to agree that the action of the foetus has nothing to do with that. Let the head, the trunk, or any separate part be left in the womb, and it will be expelled, just as if the foetus were whole, and living. The placenta, the membranes, the clots, the whole after-birth, a mole, a fibrinous concretion, a polypus, and all kinds of bodies, in short, that are met with in the womb, are incapable of any spontaneous action, and yet their expulsion is effected by the same laws and announced by the same phenomena as those of the most robust and the healthiest foetus. It is therefore undeniable that the foetus is not the efficient cause of labor; that, instead of performing a part essentially active in this process, it is on the contrary completely passive from the beginning to the end of it.

This cause should be sought for in the organs of the mother, which was not done until in the last two centuries. Galen, who in one book ascribes the expulsion of the foetus to the contractions of the womb and of the eight abdominal muscles, gives us to understand on the contrary in another, that it is the child which es-

capacities by its own exertions. J. Fabricius is a little more explicit. Courtin believed that the fœtus, the womb, and the muscles all combine. Guillemeau located positively the cause of delivery in the expulsive faculty of the uterus. Gelée maintained also that the womb and diaphragm contracted to expel the product of conception. Diemerbroeck says as much. Harvey, Levret, &c., had, it is true, already maintained that delivery is effected under the influence of the contractions of the uterus, the abdominal muscles, and diaphragm; but this opinion, being vaguely expressed, did not have any effect on the theory of parturition. Besides, Haller thought that the womb is but a secondary agent, and that the abdominal muscles and diaphragm are the chief agents. Indeed, Besse has expressly stated "that it is the contraction of the womb which dilates the neck, and which, with the diaphragm and the abdominal muscles, effects the delivery. . . . The dead child is discharged in the same way," &c. To A. Petit was reserved the glory of demonstrating, beyond dispute, that the efficient cause of labor is essentially constituted by the contractions of the uterus, and partly by those of the muscles of the abdomen and thorax.

§ 1. ESSENTIAL EFFICIENT CAUSE.

We acquire by direct observation the proof that the contractions of the uterus constitute the efficient principle of labor. By applying the hand upon the epigastrium during a pain, the womb is felt to grow hard, to shrink, to lessen in size, in one word to contract; the finger, when introduced into the vagina, perceives the orifice to become stretched, to grow thin, and dilate or contract according to the stage of the labor. As soon as the pain ceases, nothing of this sort can be perceived; all the parts become relaxed; as soon as it returns, all the phenomena of contraction reappear; but it is particularly when we are compelled, in performing some operation, to introduce the hand into the interior of the womb, that we abandon all doubt as to the important part which it performs in the expulsion of the ovum. It pretty often happens here that the operator is obliged not only to suspend his progress during each contraction, but he also sometimes loses for a short space all sensibility, all power to act, and the hand, which is benumbed, and as it were paralyzed, becomes incapable of distinguishing the objects it touches. What practitioner has not had occasion to see that it is not possible, during a pain, to pass through the os uteri? Who does not know that, when passed up to search for coagula, the placenta, or the fœtus itself, the hand is soon forcibly expelled, together with the foreign body it was designed to remove?

Strictly speaking, the contractions of the uterus might suffice for the expulsion of the child; in several cases of complete procidentia of the womb, such as those reported by Peu, Jalouzet, and Madame Lachapelle, the pregnancy has been found to go to the full term, and the labor to terminate spontaneously; many women have been unconsciously delivered during an attack of lethargy, of asphyxia, or in a deep sleep, into which they had fallen in consequence of criminal attempts. Women weakened by protracted disease, a hemorrhage, or exhausted by suffering unconnected with childbirth; those who are affected with ascites, inflammation in the chest, delirium, or madness; those whose abdominal muscles, thin, and pale, have lost almost all their contractility; such as are pusillanimous, timid, excessively irritable, or of a very marked lymphatic constitution; and lastly, all such as from debility, disease, want of courage, excess of sensibility, or want of power, do not *bear down* at all, and who, on the contrary, employ all the resources of their volition to arrest the least effort of their muscular system, are delivered notwithstanding. The womb alone in such cases bears the whole burden of parturition.

§ 2. ACCESSORY EFFICIENT CAUSE.

Nevertheless, the womb in most cases requires to be sustained by the action of the diaphragm and abdominal muscles. The concurrence of this action is so evident in most women that no observer has thought of denying its existence, and that it is sufficient to announce it as a simple proposition; but its importance has not been understood in the same way by all authors. According to Haller, the womb contracts only for the purpose of preventing the child from being pressed together into a confused mass, and to force it to present one extremity of its occipitococcygeal diameter to the straits. By their contractions, the abdominal muscles support the womb in front and on its sides, so as to prevent it from deviating, or from abandoning the direction of the axis of the pelvis, or bending in any direction, and make it in some respects resemble a straight canal, continuous with the pelvis. The descent of the diaphragm then bears wholly upon the fundus of the uterus; the cervix, being unsupported, yields to the effort; and the foetus, being forced from above downwards, passes through the genital organs as an inert and solid trunk, passing out of a long canal with inflexible parietes.

By carefully noticing the proceedings of nature, it will be perceived that the idea of Haller expresses very well the mode in which the diaphragm and abdominal muscles operate; but it is incorrect, inasmuch as it attributes to the uterus only a secondary part, whereas it is a matter of demonstration that its contractions constitute the chief cause of delivery. Upon this hypothesis, the expulsion of the ovum is almost wholly submitted to the volition of the woman, but no one is ignorant of the fact that parturition is almost entirely involuntary. Further, it was not so much Haller himself, as his commentators, who desired to limit in this way the importance of the uterine contractions; for that great man says positively that the efforts of the woman are not always indispensable to the termination of the labor.

On the contrary, far from acting with so much power on the womb, the diaphragm, as has been remarked by M. Bourdon, only serves as a firm *point d'appui* for the abdominal muscles. Whenever an effort is made, the chest dilates, the lungs fill with air, after which the glottis closes; the diaphragm gives to the base of the thorax, which is, moreover, supported within by the distended lungs, a degree of immovableness and solidity, which affords to the muscular powers a fixed point that they could not otherwise have obtained; whence it follows that it is not by pressing the viscera from above downwards, as is generally supposed, that the diaphragm assists the uterus, but rather by giving to the chest the power of resisting the contractions of the abdominal muscles, which contractions are thus rendered effective upon the body to be expelled. M. Nægèle thinks, also, but incorrectly, in my opinion, that the abdominal muscles and diaphragm have rather for their object to sustain the uterus during its contractions, than to assist it in the expulsion of the foetus.

In most women the uterus is the first and only part to contract until the foetus has reached the excavation of the pelvis. From this moment a sense of weight, of straining, or of tenesmus, irresistibly invites the concurrence of the contractions of the abdominal muscles. Whilst the sole object of the womb is to dilate its neck, it needs no aid; but when the orifice is sufficiently large, the foetus must next be forced through a firm and very narrow canal, greater powers become indispensable, and the uterus, redoubling its efforts, rarely fails to solicit the action of all the muscles of the body. The head and limbs being first fixed, the chest dilated, the diaphragm depressed, the lungs filled with air, and the glottis closed, permits the abdominal parietes, firmly attached to the pelvis and base of the thorax, to contract from before backwards, as well as laterally; the viscera, being unable to raise the phrenic septum which separates them from the lungs, transmit directly to the fundus of the womb the lively impression they have received; the latter organ, also sustained on all sides, now efficaciously employs all its powers to expel

the fœtus through the os uteri, the only point which now offers no resistance, and upon which all its efforts come to operate.*

This is the way in which the process takes place in a natural state; but the organism is sometimes obliged to take another course; the woman is not always capable of effecting this combination of actions. In certain cases, the uterus, compelled to suffice of itself, sometimes succeeds in producing the desirable result without any difficulty; but in other cases, being too feeble, either in consequence of over-distension, which destroys its tone by reducing the thickness of its walls, or of contractions too long continued or too frequently repeated, or because its function is interfered with by some modification of the natural state of its structure, it yields in importance to the muscles, which, if directed with a vigorous and courageous will, are sometimes able to expel the fœtus with but a feeble co-operation on the part of the womb.

In this sense only may labor be regarded as in some cases a partly voluntary function, as defecation, and the emission of urine. Doubtless, a woman who *bears down*, as it is called, who enforces her pains, no matter how feeble soever they may be, will get rid of the product of conception sooner; and that another may, to a certain extent, protract its expulsion by preventing as much as possible the contraction of her muscles.

A woman presented herself at Baudeloque's amphitheatre, to be delivered there; the labor at first went on very regularly; the pupils were assembled; the dilatation of the orifice was suspended, and a whole night passed without it making any progress; the spectators, who were fatigued, now dispersed; the pains soon returned, and the dilatation went on; the young men, being notified, re-assembled; again the phenomena of the labor ceased. Baudeloque, suspecting the cause of these irregularities, gave a hint to the pupils, who all left the apartment with an injunction not to go far, and to return upon the first signal; the woman immediately began to bear down, and the child's head soon reached the vulva; the pupils were then called, and the labor which it was no longer in her power to suspend, soon terminated. I witnessed a nearly similar case in 1823. One of the first women that came to lie in at my amphitheatre had pretty smart pains, and the neck of the uterus dilated regularly and promptly as long as there were only a few pupils present. When they had all assembled, she continued to complain in the same manner, but the labor did not advance at all; the whole day and night passed in this manner; in the morning all the witnesses went away to get some sleep; the dilatation began again; about noon it was quite advanced; the pupils returned, and the phenomena were immediately suspended; at nine o'clock in the evening she was left alone, and as I was going out, I said it would be well to assemble again between eleven and twelve o'clock at night. A few minutes afterwards, the pains were accompanied with a sensible dilatation, and the efforts directed with so much force, that the child passed the inferior strait at ten minutes before eleven, just as two of the students entered the room. Before she left the ward, this woman confessed that her object was to get rid of the students, and to disembarass herself as soon as they were gone. Called to a lady in labor, Dr. Dewees hastened to her assistance, as he was told that there was not one moment to be lost. As he entered the room abruptly during a pain, the contractions immediately ceased, and did not come on again for fifteen days. But these are exceptions which do not hinder us from establishing it as a general rule that the will has scarcely any influence on the progress of labor, except that exerted by

* Hence it is that women, who are urged by the bystanders to bear down during the grinding pains, find themselves unable to do so. The contraction of the accessory or abdominal muscles can be of no assistance until the child, and the womb itself, have sunk so far down into the excavation that those muscles become able to act upon the fundus uteri, so as to fix it firmly while the contraction of the uterus propels the head against the resisting points.—M.

means of the abdominal muscles and diaphragm. But I would not dare to state positively, with M. Nægèle, that the contractions of the uterus, accompanied with acute pain, are entirely beyond the power of the will.

ART. II.—DETERMINING OR OCCASIONAL CAUSES.

When it is remembered how much time was required to acquire correct notions concerning the efficient causes, no surprise ought to be felt at the vagueness of opinions at the present day in regard to the determining causes of labor. The ideas first entertained varied in accordance with the predominant medical hypotheses of each particular period; and then according to the notions entertained by accoucheurs upon the efficient causes: sometimes they were referred to the fœtus, and sometimes to the womb or other parts of the mother. They may be divided into natural determining causes, and accidental determining causes. The former necessarily have their origin in the ovum, or in the economy of the woman; they exist, therefore, in every case, and belong to labor properly so called. The latter are derived from without, are foreign to the organism, depend upon a disease of the ovum or womb, or upon some particular predisposition, &c.; they are, strictly speaking, the causes of abortion: and I shall, therefore, not treat further of them in this place.

Believing that the fœtus itself opened a passage for its escape, certain authors imagined that the waters of the amnios become so acrid and irritating as at last to produce a painful excitation of the skin; that the bladder and rectum, fatigued by the presence of the urine and meconium, caused the child to feel a necessity of passing off these matters; that the too elevated temperature of the uterus forced it to come forth and seek in the air the means of refreshment; that it could not live without respiration; that it was affected by the obliteration of the utero-placental canals, and of a part of the vascular system of the placenta itself; that it no longer received sufficient materials for its growth; that its weight and maturity led it to detach itself, as a ripe fruit falls from the limb of a tree; and that the circulation could not be longer performed without the action of the lungs. At a first glance, it might seem superfluous to repeat all these various opinions, since it is actually demonstrated that the child is not the active agent of its own escape; but, as it has been on the other hand pretended that it only puts the uterine contractions into play, under the influence of the same causes of uneasiness, embarrassment, or necessity, I thought it best not to pass them over in silence.

In the first place, all this scaffolding is supported on mere suppositions. As has been said by A. Petit, no fluid in the animal economy is less acrid than the liquor of the amnios; if it ever does acquire any irritating properties, it happens as often at six, seven, or eight months as at nine, and it has never been shown that the termination of pregnancy in such cases was advanced one single day.

The child is so little disturbed by the necessity of voiding its meconium or urine, that it sometimes remains several days after birth without discharging them. Who told it that outside of its place of habitation there was air for it to breathe, and to cool the heat of its blood? The temperature of the uterine cavity is the same as that of the rest of a woman's body, and a thermometer placed there during labor would not rise any higher than one held in her mouth; moreover, the experiments of Edwards prove that, far from being burning hot, the temperature of the fœtus is two degrees lower than that of the mother, as long as it remains in the womb; it is not true that the anatomical disposition of the utero-fœtal vascular system is at child-birth sensibly different from what it was a few weeks previously; nor is it more true that the ovum is permeable by fluids, or less adherent at the end than about the middle, or even at the commencement of

gestation. Blumenbach uses an ingenious metaphor in saying that it separates like ripe fruit, but nothing like explanation has been thereby gained.

But, if it be true that the sudden, violent, and convulsive-like movements of the child sometimes force the labor to come on before the natural term, it is not less true that that is an accident which ought to be classed among the causes of abortion, and that labor most frequently comes on without anything of that kind being noticed. Roederer, who refutes in detail the partisans of the somerset, already observed that most of his cotemporaries no longer admit it, and says that the head descends little by little by its own weight. Neither can the contractions of the ductus arteriosus, the ductus venosus, and foramen ovale, as they do not take place to the same extent in every fœtus, be the cause of a phenomenon whose period very rarely varies, and with which variations it has besides no correspondence.

An anonymous author, who was for a long time opposed by Millot, speaks of a vacuum that takes place in the *sac of generation*, in consequence of the transudation of its waters, and pretends that the uterus, obeying its natural elasticity, closes up so as to remove this void; but it is easy to perceive that this author mistakes the effect for the cause, and has misunderstood the question.

Steinzel and others have referred the occasional cause of parturition to the periodical *nîsus* of each menstrual period. But in the first place many pregnant women are met with, in whom the habit of menstruation has never been exhibited. Now the influence of habit is felt so much the more powerfully, the nearer we are to the instant when it was left off. Yet, in the hypothesis of Steinzel, precisely the contrary is remarked. Besides, in order to see at once the futility of such a theory, it is merely necessary to advert to the fact that the ninth catamenial revolution takes place in some females at the commencement of the eighth month, in others at the seventh, often at the end of the tenth, and that a good many women do not menstruate more than two or three times a year, while the differences observed in the duration of pregnancies are so few that many persons still doubt as to their existence.

MM. Lobstein and Chaussier seem to admit that this cause, which has been so much sought for, is found in the completion of the organization of the womb, which waits until the muscular character of its fibres is fully developed before it contracts. But miscarriages and premature labors fully demonstrate the insufficiency of such an explanation.

According to Loder, the extensibility of the womb is confined within certain limits; the fibres of the womb, fatigued by a long-continued state of distension, being unable to yield any further, react, at the end of the ninth month, upon the body that had kept them so long extended, and thus decide the act of parturition; but, upon reflecting that the development of the womb is not a passive phenomenon, that twin pregnancies, or those where the ovum from some cause attains to very great dimensions, do not terminate any sooner than those where the womb acquires but a very small size, we are compelled to reject this hypothesis also. M. Reuter, who in a learned dissertation discussed at length the value of the different opinions on the causes of labor, has not added any more satisfactory explanation.

The opinion of Levret and Baudelocque, entertained also by M. Désormeaux, has at the present day the greatest number of partisans. Founded on the arrangement of the uterine fibres, and upon observation of the phenomena of pregnancy, it has appeared to be more satisfactory than any other. It is said—if the cavity of the body of the womb, only, enlarges during the first four or five months, and that of the cervix afterwards dilates by degrees, from above downwards, and confounds itself with the former, it depends upon the circumstance that the fibres of the body and fundus, placed lengthwise, and being the softest and most extensible, distend and yield more easily than those of the neck, which are circular,

denser, more compact, and situated transversely. Between them is established a kind of balancing or contest, which results in the induction of labor: those of the body must be looked upon as so many loops which embrace the ovum in their concavity, while their extremities are attached to different points of the circles of the neck; the former at first yield without difficulty, and even without re-acting upon the latter; but about the middle of pregnancy, by elongating, they stretch the fibres of the neck, whose circles disappear or are thus drawn in succession into the body of the organ; so that at last the canal of the neck no longer exists, but merely an orifice with a circumference of greater or less thickness. There is then an equilibrium between the neck and body of the womb; but, as the looped fibres have now no other resistance to overcome than the circular fibres, they triumph over the os uteri with great facility, the equilibrium is soon broken, and labor commences.

According to this view of the circumstances, I should define the determining cause of labor to be, *the tendency of the fibres of the body of the uterus to contract*; a tendency or effort which produces no real and sensible effect until from the moment when the cervix ceases to furnish any further materials to the enlargement of the womb.

A. Petit expressed himself upon this subject somewhat differently: "It cannot be doubted," says that author, "that the determining cause of the uterine contractions is the irritation experienced by the uterus when pregnancy has reached its full term. I consider the cervix as a *magazine* in which nature has placed in reserve the quantity of muscular fibres which she needs, to furnish by their development materials for the expansion of the womb during the course of gestation. In the natural state, this expansion, when once begun, proceeds *pari passu* with the growth of the fœtus; everything is proportioned, fixed, so that, when the latter is sufficiently developed to bear the action of external agents, and employ them for its own benefit, all the fibres of the cervix have yielded, and the magazine is exhausted; labor will therefore take place when all the fibres that had been placed in reserve in different parts of the womb, and chiefly in the substance of the cervix, shall have been employed. As long as any of them remain, the womb may go on increasing, and no irritation will be occasioned; a simple development is not capable of producing it."

This explanation is more rational than the version given of it by Baudelocque. The idea of a struggle between the fibres of the different points of the uterus is doubtless ingenious, but the fact which it expresses has no existence in nature. To me it seems evident that, by imbibing fluids during the pregnancy, the organ of gestation is enabled to unfold its fibres in an active manner; that this unfolding takes place first in the body and fundus, because there the ovum is lodged in the commencement; that it afterwards takes place in the neck by the same mechanism, that is, by the accumulation of liquid molecules, which gradually separate the constituent molecules of the fibres; that this unfolding being brought to a conclusion, and the womb besides having acquired the compliment of its muscular organization, enters upon its contractile state for the purpose of expelling the body that fills its cavity, and that now begins to produce in it a more lively state of irritation.

Miscarriages, and premature labors, as well as protracted gestation, &c., might be rigorously accommodated to this mode of interpretation; but another one is required for extra-uterine pregnancy. Where the ovum is developed in the tube, or in the abdomen, or substance of the womb, what in fact becomes of this balance betwixt the action of the fibres of the neck and body, this magazine held in reserve, this unfolding of the fibres, which at a first view gives so satisfactory a solution of all the other cases? Let us then frankly confess that the deeper we search into the question of the determining causes of labor, the greater will be the number of objections against the explanations that have been given. The

more wise would, perhaps, still say, with Avicenna, "that, at a fixed time, labor takes place by the grace of God." But do we any better know the determining causes of the contraction of the heart, and of an infinity of other actions which, like it, must be admitted as facts?

SECT. II.—LABOR.

The name of labor or travail is given to the collection of phenomena which constitute child-birth; or, if we choose, child-birth gives rise to a series of phenomena, local or general, which are embraced under the one title of labor.

As the phenomena of labor are numerous, and appear in succession, it has been frequently attempted to group them, to form different bundles of them, so as to class them better in the memory; but as these divisions have never been established otherwise than upon arbitrary or purely conventional data, it has happened that they do not resemble each other in any two books. A. Petit, for example, admits three, without saying anything of the limits to be allowed to each of them. Stein describes four, and that, too, not less vaguely than the former. Millot also thinks that labor ought to be divided into four stages: the first, which he calls the *secret stage*, because the women are scarcely conscious of it, comprises the different symptoms that manifest themselves in the four, five, or six days immediately antecedent to the term of gestation; the second extends from the first appearance of the pains to the discharge of the waters; the third begins after the rupture of the membranes; and the fourth when the child is on the point of being delivered.

Millot's *secret stage* is classed among the precursory signs by Madame Boivin, who, like Chaussier and Adelon, admits five stages; four for the labor itself, and the fifth for the delivery of the after-birth, but without indicating any very well marked line of distinction between them. M. Maygrier also reckons four stages, as Romer does, and does not circumscribe them either. Denman or Hamilton seem to have been the first to lay the foundation of a good division of labor; according to them, the first stage commences with the first pains, and ends with the complete dilatation of the neck, or with the rupture of the membranes; the second extends to the complete expulsion of the fœtus; and the third comprises the delivery of the after-birth. In this way each stage forming a period rigorously determined, it becomes no longer possible to extend or limit as we please the acceptance of the terms made use of. We might, also, after the example of Burns, describe only two stages, properly so called, and make the delivery of the secundines a separate labor, which appears to me to be rational. M. Désormeaux, who was fully sensible of the advantages of Denman's method, has done better by carrying the first stage to the complete dilatation of the os uteri, without regard to the rupture of the membranes. I shall adopt this course myself, and divide labor only into two principal stages: one which terminates when the dilatation is finished; and another which begins at that moment, and ends with the delivery of the child.

Nevertheless, I shall add, as an independent period, what Millot calls the *secret stage*, or what Madame Boivin describes under the title of *precursory signs*.

We may see by the following table how the divisions of labor have varied:—

- A. Saxtorph. 5 *Periods*.—1st. The prodromes. 2d. The glairy mucus and formation of the bag of waters. 3d. The discharge of the waters and descent of the head. 4th. The escape of the child. 5th. The delivery of the placenta.
- B. Bard. 4 *Periods*.—1st. The dilatation of the internal orifice. 2d. The descent of the head. 3d. Its delivery. 4th. The delivery of the placenta.
- C. Hogben. 5 *Periods*.—1st. The entrance of the head into the superior strait. 2d. Its arrival at the inferior strait. 3d. The dilatation of the soft parts. 4th. The escape of the child. 5th. The delivery of the placenta.

- D. Romer.* 4 *Periods*.—1st. The precursory signs. 2d. The preparatory pains. 3d. The true pains. 4th. The *dolores conquassantes*.
- E. The London practice of midwifery.* 4 *Periods*.—1st. The entrance of the head. 2d. Its escape from the neck of the uterus. 3d. Its arrival at the vulva. 4th. The escape of the infant and the placenta.
- F. Baudelocque.* 4 *Periods*.—1st. Slight dilatation of the neck of the womb. 2d. Complete dilatation. 3d. Discharge of glairy mucus and rupture of the bag of waters. 4th. The escape of the fœtus.
- G. Flamant.* 4 *Periods*.—1st. When the head is above the superior strait. 2d. When the parietal protuberance is at the inferior strait. 3d. The escape of the head. 4th. The delivery of the placenta; or, according to M. Guille-mot: 1st. The entrance of the head to the parietal protuberance. 2d. Its complete entrance. 3d. Its great axis in correspondence with that of the inferior strait. 4th. The delivery of the placenta.
- H. Merriman.* 4 *Periods*.—1st. Dilatation of the neck to two inches. 2d. The appearance of the occiput under the arch of the pubis. 3d. The expulsion of the fœtus. 4th. The delivery of the placenta.
- I. Blundell.* 3 *Periods*.—1st. Dilatation and rupture of the membranes. 2d. Expulsion of the child. 3d. The delivery of the after-birth.
- J. Levret.* 4 *Periods*.—1st. *Mouches*. 2d. The show. 3d. The formation of the bag of waters. 4th. The expulsion of the child.
- K. Deleurye.* 4 *Periods*.—1st. The precursory signs. 2d. The preparatory pains. 3d. The determining pains. 4th. The expulsive pains.
- L. Rœderer.* 5 *Periods*.—1st. The head at the superior strait, with the mouth of the uterus dilated. 2d. The head in the cavity of the pelvis. 3d. The head at the inferior strait. 4th. The escape of the child. 5th. The delivery of the placenta.
- M. Carus.* 5 *Periods*.—1st. The precursory signs. 2d. The dilatation of the neck. 3d. The discharge of the waters. 4th. The head in the vagina and escape of the fœtus. 5th. The delivery of the after-birth.
- N. Hamilton.* 3 *Periods*.—1st. Dilatation. 2d. Expulsion. 3d. The delivery of the placenta.
- O. Velpeau.* 4 *Periods*.—1st. Precursory signs. 2d. Dilatation. 3d. Expulsion. 4th. The delivery of the placenta.
- P. Nægèle.* 5 *Periods*.—1st. The prodromes to the opening of the os uteri. 2d. To the complete dilatation of the os uteri. 3d. The rupture of the membranes, and passage of the head into the pelvic excavation. 4th. The appearance of the head at the vulva and its expulsion. 5th. The delivery of the after-birth.

ART. I.—PRECURSORY SIGNS (1st STAGE).

Labor sometimes comes on suddenly, and without any preliminary symptom: however, the organism, which rarely proceeds to the exercise of its smallest functions without some prelude, is most commonly true to its accustomed march, whenever the question is upon terminating the great act of reproduction.

From two to fifteen, and even twenty days before the period, nature in some subjects seems to try her forces; the belly diminishes in size sensibly: the fundus, and even the whole mass of the womb, subside; the motions of the child are felt more than in common; the infiltration and the varicose condition of the lower extremities increase or now become manifest, if not previously present; the labia pudendi in particular become swelled, softened, and occasionally painful; the digestion is better performed; the nausea, vomiting, and curious appetite are done away with, if they had not long before ceased to exist; the respiration is not so short nor so impeded; the women regain their habitual gaiety and lively humor, are not so sleepy, more disposed to exertion, more active, and often induced to believe,

at least in first pregnancies, that their term is further off than they had before supposed. They have a sense of weight in the pelvis, or, as they say, at the *fundament*, with more frequent disposition to stool, and to void their urine. It is then, particularly, that all the articulations, all the ligaments of the pelvic cavity become softened and relaxed; which renders walking, and even standing itself, more difficult, more fatiguing, and sometimes even absolutely painful, although the woman is more disposed for them. The secretion of mucus in the genital passages becomes more active, and glairy matter in more or less abundance escapes in flocks from the vagina and vulva; it is not very rare to find the womb in an altogether peculiar state of fibrillar contraction, which may be regarded as a passage from its state of rest to that of its real contraction: that is to say, by touching the os uteri, we feel that it is from time to time in a state of slight tension or constriction, and by feeling the body of the organ above the pubis, a movement is found to take place in it; so true is it that the point of departure of labor cannot always be precisely determined.

These different phenomena, which necessarily vary in number, progress, and degree in different women, are in general of good augury, provided they are not converted into symptoms of disease. They announce that nature is collecting her forces, uniting her resources, and making all suitable dispositions to accomplish the function she has been so long preparing for. As to their explanation, it is perfectly natural; they all refer directly or indirectly to the change of position of the womb. By plunging down into the excavation, this organ necessarily presses with more or less force upon the rectum, the bladder, the nervous plexuses, and the blood-vessels; thence come the tenesmus, the bearing down, the lymphatic or sanguine engorgement of the lower limbs and vulva, the relaxation of the symphyses, the formation of mucus, &c. By sinking lower down, and removing to a distance from the epigastrium, the womb leaves the stomach and liver more unconstrained; the diaphragm, being less elevated, permits the lungs to dilate more, whence more freedom in respiration, circulation, the digestive functions, and consequently in the exercise of the intellectual and locomotive faculties.

ART. II.—DILATATION (2d STAGE).

After these preliminaries, labor at length begins; its origin is marked by pains, and short and slight colicky sensations, recurring at considerable intervals. The external parts of generation become moist, and the secretion of glairy mucus, provided it had not appeared before, is added to the number of precursory symptoms. When the colic pains are present, the womb hardens, becomes rounder, and its summit sinks into the excavation; it diminishes in all its diameters; in one word, it contracts: the lips of the os tincæ are effaced, and in an evident manner grow thinner; the orifice stretches, and from the same cause loses its thickness, assumes more decidedly the form of a circle, and manifestly contracts; by introducing the finger into it, the membranes of the ovum will be found endeavoring to engage in it; they are compressed by it, and forced lower down; they grow harder, become tense, very elastic, and difficult to indent. The woman is now frequently tormented with sinister forebodings; she becomes low-spirited, and despairs of safety, says she is going to die, loses all her courage, and is overwhelmed with gloomy thoughts, and a sadness which nothing seems able to dispel; she weeps, is agitated, or remains motionless, and in some instances feels horripilations all over the body. Animals themselves, a very remarkable circumstance, also fall into this state of dejection at the commencement of labor; they refuse to eat or drink, seem to be tormented with fear, and to be occupied only with the dangers that threaten them.

The pains, which gradually increase in strength and severity, at the same time become longer and more frequent; reddish or bloody striae are soon found to be

mixed with the mucous discharges, which are also found to be increased in quantity; the mouth of the womb begins to open, and dilates by degrees; the lower segment of the ovum passes through it, and under the title of *bag of waters*, projects into the upper part of the vagina; as the pains grow more severe, the general irritation becomes more considerable; the interval between the contractions is not calm; the woman is touchy, cross, impatient, difficult to control; she cannot keep in one place, is discontented with everybody, and has an extreme susceptibility.

Every pain in some degree resembles a paroxysm of fever. It is preceded with a rigor, and sometimes even with a tremor and rattling of the teeth together. The quickness, frequency, and hardness of the pulse and temperature of the body augment. The skin is more highly colored, and becomes moist. The mouth and tongue dry; the teeth and lips are encrusted, become fuliginous, as in an adynamic fever; a great thirst comes on; she has nausea, vomiting, and cough; she wanders, and the intellectual derangement is often carried to such an extent as to resemble delirium. In irritable women, the anguish and restlessness are sometimes carried to the highest degree; and the hardest heart could scarcely resist a feeling of compassion and pity at the sight of these unhappy beings, who, with disheveled hair, blackened mouths, flushed countenance, burning skin, and haggard eyes, can only become mothers at the cost of so many sufferings and dangers. When a contraction is over, everything returns to its natural state; the restlessness ceases; the pulse recovers its ordinary type; the mouth becomes moist; the skin regains its natural color and habitual temperature: if an examination be now made, the membranes, having returned within the cavity of the womb, feel flaccid and wrinkled, and the bag of waters cannot be felt; the edges of the os uteri, which during the pain were hard, thin, and sharp, are supple, thick, and rounded immediately after it. The nausea is suspended, but the belly, particularly the epigastrium, most generally remains very tender. Each pain reproduces the same series of phenomena, and is succeeded by a more and more complete remission, which also grows shorter and shorter. The os uteri, which represents the resistance to be overcome, gradually yields; its dilatation at length becomes so complete, that there is no contraction betwixt the uterus and vagina. Thus is terminated the first stage of labor, the longest and most fatiguing period of parturition, but not the most dangerous or difficult.

ART. III.—EXPULSION (3d STAGE).

In the first stage, the womb performs almost the whole duty of the labor; it dilates the cervix, and forces the apex of the ovum to engage itself therein; it either does not solicit at all, or but very feebly, the contractions of the muscles, whose concurrence has not as yet become indispensable. In the second stage, the contractions in the first place become stronger, last for a longer period of time, are not so far apart, and yet are followed by a more decided calm; the courage returns, the sadness is dissipated; some women, oppressed with the want of rest, sleep quite soundly during the short interval between the pains. I once attended a lady in labor, who, having been three days and nights in the anguish of a most painful travail, slept several times on the morning of the fourth, notwithstanding that the contractions were carried to the highest degree of intensity, and there was scarcely more than one or two minutes between them. A feeling of weight and bearing down, by some referred to the pressure experienced by the cervix, but which depends rather upon that of the rectum and bladder, soon compels the woman to second her pains; and, almost in spite of herself, to contract the abdominal muscles and make the most violent efforts.

The bag of waters, the only portion of the ovum which is not compressed externally, having no support whatever in the superior part of the vagina, bursts in the midst of one of the most violent pains; the fetus, forced downwards by the

same contractions, immediately takes the place occupied by the segment of the membranes, and, by engaging in the passage like a stopper or plug, prevents the escape of the rest of the waters; and the head, if it be the presenting part, is then said to be at the crowning (*couronnement*). The void thus produced in the womb is the reason why the labor seems to slacken for a little while; but when this void disappears, and the uterus is recovered from its *astonishment* (I hope the expression will be pardoned), the pains recover all their energy, and succeed each other with great rapidity. Each one is ushered in with a general shiver; the severest ones are often preceded by another which is milder, and serves as a prelude to them; on other occasions, we observe one stronger and one weaker, alternately, regularly, and without our being able to regard one as a sequel to the other. When they come on, the woman lays hold of anything solid in her reach, plants her heels upon the mattress, seizes with her hands the sides of the bed or bolster, or the persons around her, to secure a *point d'appui*; she then throws her head back, draws a long breath, and all the levers of her skeleton being thus fixed, contracts, with all her power, the muscles of the belly, while the diaphragm and all the muscles of her body act with the same energy; the neck and face swell, are engorged with blood, and become purple or livid; the jugular veins acquire an enormous size; the carotids beat violently; the thyroid gland becomes engorged; the eyes sparkle, grow red, and seem to start from their orbits; all the symptoms of cerebral congestion become manifest; the general circulation is strongly excited; sweat sometimes pours from the skin, but only about the head, breast, and abdomen, for the lower extremities, receiving less blood than common, not unfrequently remain below their ordinary temperature; at length, when the contraction is just about to cease, this agitation gives place to rapid sobs, which soon restore calmness to the functions.

After a certain length of time, generally very short, another pain comes on, accompanied with the same anguish, and followed by the same phenomena. As it begins, a small quantity of liquor amnii is seen to flow off, because the child does not exactly fill up the cervix during the interval between the pains: but by forcing the presenting part to engage in the utero-vaginal orifice, the uterine contraction soon puts a stop to this discharge, which reappears towards the close of each pain, because the fœtus, ceasing to be pressed downwards, returns into the cavity of the womb. If the pains be somewhat strong, the head soon passes through the cervix into the upper part of the vagina, which gradually dilates to receive it, and it descends into the excavation, exerting an increasing pressure on the rectum and bas-fond of the bladder; the bearings-down are now redoubled, strangury comes on, and cramps are felt in the thighs and legs; if any fecal matters are contained in the rectum below the superior strait, they are mechanically forced out; the amplitude of the vagina increases in every direction by the unfolding of the wrinkles, always, except during labor, observable on its interior. M. Nægèle admits that the canal contracts and thus aids the descent of the fœtus. This is an opinion in which M. Mondière seems to participate, and which an observation of M. Halma-Grand supports, if all his expressions are taken literally. For my part, I have never been able to recognize the slightest appearance of contraction in the vagina during labor, and I doubt whether it is really appreciable. The head approaches the inferior strait, the coccyx retires backwards, the anus projects; the whole perineum is elongated, and becomes thinner as the inferior angle of the vulva is carried forwards, and the plane of this opening at last comes to be almost parallel with the axis of the body, instead of representing, as before, the plane of the lesser strait of the dried pelvis. The labia being put on the stretch are undoubled, and even drag a portion of the skin of the thighs towards themselves. The mons veneris is lessened in size; but it is entirely false to say that the nymphæ are also unfolded. At length a pain, which is stronger than any preceding one, which forces the woman to utter cries of despair, and which is com-

posed of two pains of unequal violence, for which nature seems to have rallied all her remaining muscular power, triumphs over all resistance. The most powerful contraction that has yet occurred brings the parietal protuberances on a level with the tuberosities of the ischia. One more degree of power is about to force them through, but that power is just about to diminish. Nature, who has almost overcome all obstacles, seems to be ready to fail in her last effort. Just as she is about to attain the object of so many exertions, she is seen ready to yield once more to the reactions of the perineum. But one more attempt of the organism gives rise to a new pain which comes to the assistance of the preceding one before it has quite ceased, as if to sustain it, and the head finally escapes through the vulva. In consequence of the vacuity which has just occurred in the womb, provided the body of the child does not immediately follow the head, it is not commonly expelled until after a calm of a few seconds or a few minutes, when a short and moderately strong contraction occasions its escape, together with that of the remainder of the liquor amnii.

The labor is finished. One of the most melting scenes, a scene most adapted vividly to affect the human heart, is presented to the eyes of the philosophical accoucheur. To those piercing cries and violent agitation, to those transports of despair, those excessive efforts, those inexpressible agonies, those dilacerating pains, which seem to be intolerable, instantly succeeds a delicious calm, full of charms, says M. Désormeaux, and interrupted only by the happy idea of being a mother. The new-born child cries, and all the sufferings of the mother, so courageously borne, are forgotten; passionate expressions of satisfaction are substituted for those of pain; sobs of happiness succeed to the sobs of despair; and this sudden transition from the extremest dread, from a frightful state of anxiety, to the height of joy and of the tenderest affections, is, in sensible and amiable women, one among those appearances which most imperiously demand our admiration for a sex whose other claims to it are so numerous.

There is no necessity for my stating that this general *tableau* is far from being applicable to all women, or even to all the labors of the same woman. It is principally among the robust, vigorous, and young, who are delivered for the first time, that we meet with most of these phenomena. Among others, they offer many different shades. Their development requires a lapse of time, which also presents very great diversities in different countries, and among different subjects.

ART. IV.—DURATION OF LABOR.

The duration of labor is, according to the reports of travelers, much shorter among savages than among civilized people; among the negroes and Indians of America than among Asiatics and Europeans; in hot climates than in cold countries; in Italy, Spain, and Portugal, for example, than in France, Russia, and Germany; in women who have passed their lives in luxury and idleness, than in those who live in the country, and are obliged to labor hard for a support. In general, labor lasts from four to eight or ten hours in Holland, England, and France; it is about the same in Switzerland and Germany; so that Haller was evidently deceived when he stated that the duration of a labor is from an hour and a half to two hours. The mean term of this function is about six hours. The time taken by Merriman is twelve hours for one hundred and eleven women; from twelve to twenty-four hours for seventy; from twenty-four to thirty hours for twelve; from thirty to forty hours for sixteen; from forty to fifty hours for seven; from fifty to sixty hours for five; from sixty to seventy hours for three; and from seventy to eighty hours for two, which is certainly the longest time ever observed in France. Of 442 women observed at Wellesley in 1832, by Mr. Mawsell, 200 were delivered in less than two hours; 146 between six and twelve hours; thirty-five between twelve and eighteen hours; eighty-four between eighteen

and twenty-four hours; fifteen between twenty-four and forty-eight hours; two in sixty hours; and one in seventy-two hours. I have proved that the opinion of M. Leroy, who believes that the pains follow the period of six hours, and that labor lasts six, twelve, eighteen, twenty-four, or thirty hours, is not entirely without foundation.

For the rest I do not believe that the differences of social condition, of diet, of country, &c., have as much influence on the duration of labor as we seem to think. I have seen it last even in Paris, three, four, five, and six days, without accident, in the most opposite classes of society. A woman living in ease and luxury may, on the contrary, be delivered so rapidly that the child may almost always be born when the accoucheur arrives, no matter how quick he may be.

ART. V.—SPECIAL PHENOMENA OF LABOR.

The four most constant and essential phenomena of labor are, as may have been above seen, the contraction of the uterus, or *pain*, the *dilatation* of the cervix, the *formation of the bag of waters*, and the *discharge of glairy mucus*.

§ 1. OF LABOR-PAINS.

A. In midwifery, the word *pain* is synonymous with *uterine contraction*; nevertheless, it should not be forgotten that this is only conventional language, employed by physicians to make themselves understood by the vulgar, and that these two things are essentially distinct. It is true that pain is connected with contraction of the womb; that they begin, progress, decrease, and cease together; that the energy of the one is most commonly in a direct ratio to the acuteness of the other; but it is very certain, also, that the contrary may be met with, so that no labor can be concluded without the contraction, while many may be cited as having taken place without pain. It may be believed, for example, that M. Jourdain saw in Russia a woman delivered without any pain.

Everybody has observed, like M. Flamant, that in most women the contractions come on a good while before the pains. Nevertheless, it is by the pain that we estimate the contraction and its strength; the former is the sign of the latter. However, there may be numerous shades of difference in the intensity of the pains, without the strength of the contraction being on that account necessarily different. In a nervous and extremely irritable woman, a very slight contraction sometimes produces the very severest pain; on the contrary, a woman of a lymphatic temperament, indifferent as to small matters, and who has but little sensibility, scarcely suffers at all, although the womb contracts strongly; some women, from an excess of timidity, fear, or pusillanimity, cry out aloud upon the slightest contraction of the womb, while courage and resignation lead others to bear the strongest contractions without complaining. Finally, there are a few who, for the purpose of securing more attention, or inspiring more compassion and pity, scream and worry themselves in a most extraordinary manner, although they in reality suffer but very little. There are also those who arm themselves with artificial courage, who resolve beforehand not to complain or cry out, no matter how strong the pains may be, and at the expense of life make the most incredible efforts to impose silence upon the most violent sufferings, and refrain from the most legitimate outcries; so true it is that charlatanism and ostentation find occasions for exercise even in human infirmities! It may also happen that the presence of strangers, or of persons displeasing to the woman in labor, of whom she is afraid, or with whom she naturally has no familiarity, restrains her, and prevents her from giving free expression to the sensations she experiences.

1st. *At the commencement*, the pains are so weak and superficial that they have received the title of flies (*mouches*), doubtless in allusion to the slight sensation produced by the bite of that insect, or that occasioned by its creeping on the skin.

They are then called, also, *preliminary pains*, *little pains*: characterized by a sort of shuddering of the body of the womb, they arise in the umbilical region, and are lost therein, or spread, so to speak, over the whole hypogastrium and flanks.

2d. *At a more advanced stage*, when the labor is fairly set in, the pains, which are longer, stronger, nearer together, and more decided, are called *preparative*, after the arrangement of Barbaut, who calls them the second period expulsive or determining, and as Lauerjat also does. Never was epithet better applied; their business is, in fact, to prepare for the expulsion of the ovum, or preside over the dilatation of the cervix; from the neighborhood of the umbilicus they generally extend towards the sacro-vertebral angle, or to the centre of the strait; this is the period during which the woman is most impatient, cross, sad, worried, difficult to govern, and utters the sharpest cry, which perhaps depends upon the womb acting alone, and leaving to the woman the free exercise of her general sensibility.

3d. *At the end of the first stage*, and more particularly in the second, the pains visibly change their character, assume the denomination of bearing or *expulsive pains*, and in fact announce, as Deventer has already noted, that nature is employing all her resources for the expulsion of the fœtus. These pains, which are also designated as the *great pains*, are much stronger, longer, and more complete than those of the first stage, and are, besides, characterized by being separated by intervals more perfect, better marked, and more calm, by giving rise to strangury and tenesmus, or a sense of weight, which brings the abdominal muscles into play, and forces the woman to bear down, and make exertions to assist the uterus. Notwithstanding their severity, they do not excite her irritability so much, and are borne with more resignation and patience. The women who seem carefully to avoid every preparative pain are, on the contrary, anxious for the return of the expulsive ones; they invite and solicit them; they converse, are tranquil, and during the intervals between them are even lively, and forget the dangers, a sense of which had previously caused them to be so downcast.

Their cries are different from those they uttered in the first stage, and often this difference is sufficiently pronounced to enable an accoucheur, at all experienced, to determine whether a woman is actually in the first or second stage of labor. The cries which accompany the first are sharp, and resemble those occasioned by any other species of suffering. Those of the second stage, on the contrary, seem to be suppressed, like those of a person carrying a heavy burden. The former are free and open, and take place during the act of expiration; the latter are restrained by the closure of the glottis, and can scarcely be heard except during inspiration; the former are expressive of *suffering*, the latter of *exertion*.

4th. *When labor approaches its termination*, the pains, which are sometimes of an extreme degree of violence, are pretty frequently accompanied with a kind of convulsive trembling, during which it seems as if the bones of the pelvis are about to separate or break, and all the genital organs threatened with immediate laceration, have been denominated *dolores conquassantes*, a barbarous and ill-sounding term, but strongly expressive of the state of the case, and which Roederer and Blumenbach have already adopted. Their only special character, however, is their high degree of intensity, for they do not otherwise differ from the expulsive pains, properly so called.

As has been already seen, the direction of the pains is not the same in every stage of the labor; they most frequently follow the great axis of the womb, or the occipito-occygeal diameter of the fetus, and consequently terminate at a point which is so much the nearer to the centre of the vulva, in proportion as the fœtus is nearer its passage through the inferior strait; whence it follows that an anterior obliquity of the womb is one of the most evident causes of those disagreeable pains that are called *pains in the back*, and to the consideration of which I shall return in another page.

5th. *Causes and seat.*—The pains of labor are occasioned by the contractions of the uterus. Stein says that women would doubtless bring forth their children without any pain, were it not for the powerful resistance offered to the passage of the fœtus by the inferior segment of the womb and the neighboring parts, which by their antagonism give rise to pain. Levret finds its cause in the resistance of the ovum. We can scarcely understand that Ryan could have stated to Dewees and Power that natural labor is not accompanied by pain. According to Asdrubali, there is not the least doubt that the seat of labor-pain is in the very orifice, and not in the body and fundus of the uterus, as supposed by most accoucheurs. Denman, in speaking of labor-pains, does not attempt to define their seat; he is satisfied with stating that, in labor, the degree of power can only be estimated by the resistance, the resistance by the pain, and the pain by the expression. So that his opinion, which is adopted by most of the English practitioners, and which Hopkins characterizes as the most rational one, is very nearly the same as that of Stein and Levret.

Hay and M. Bilon have endeavored to prove that the seat of labor-pain is in the cervix much more than in the body of the womb; their principal argument is, that the former receives its nerves from the sacral plexus, which is one of the divisions of the cerebral nervous system, while the latter receives its supply from the hypogastric plexus, which belongs to the ganglionic system, and which has no communication with the brain. Madame Boivin, who speaks from what she has experienced in her own person, advocates the same idea, and thinks that the contractions of the body and fundus of the womb are not more painful than those of the abdominal muscles and bladder and rectum.

If it be true that the cervix is endowed with a more acute sensibility, receives a more abundant supply of nerves than the rest of the organ, and is powerfully stretched by the contractions, and that all the efforts of the uterus are directed upon that point, it is not less so that, during the strongest as well as the weakest contractions, the pains are equally felt throughout the whole extent of the womb. If the pressure of the fœtus and the tractions exerted upon the cervix were the only causes of pain, women ought not to suffer at all after the dilatation is completed; yet, notwithstanding, their most violent sufferings are experienced after that very period; and, during the delivery of the placenta, is it in the neck that we are to place the seat of the pains?

Others have asserted that the pains of labor are owing to the compression of organs contained within the pelvis; of the nervous plexuses, for example. Girard of Lyons, who still maintains this supposition, thinks that the contractions of the uterus are not more painful of themselves than those of the stomach or bladder. But when the lumbar or sacral nerves are compressed, pain is felt in the limbs, and not in the excavation. The pains extend from above downwards, both at the beginning and end of the process, and occupy the whole hypogastrium, and not merely the lesser basin; as long as the head remains above the superior strait, where the fœtus presents transversely, or when it comes by the feet, we cannot refer the pains to this kind of compression. To maintain, with some writers, that they depend on compression of the nervous branches distributed upon the inner surface of the womb, is only to advance one of those numerous assertions, hazarded without proof, which are but too often met with in medical works.*

Thus the essential cause of labor-pain is wholly unknown; it is a question in physiology which deserves and requires new researches. What is demonstrated by observation is, that all parts of the womb, either unitedly or singly, may be

* If, during labor, the finger be hooked in the dilating circle of the os uteri, and drawn so as to put it on the stretch, a pain is produced resembling that which is felt during the grinding pains. The most intense pain of parturition is the result of the extension of the vagina, the perineum, and labia.--M.

the seat of pain during labor; that, in certain cases, the stretching of the neck concurs, perhaps, more than all other causes in its production, and that pressure upon the neighboring parts is not always unconcerned in it.

6th. There is another long-debated question relative to the *intermittence of the pains of labor*. A. Petit and A. Leroy say that, were not the pain to cease after it had set in, or if there were only one single pain, the woman would sink under it, and could not bear it; whereas, being reduced as it is into fragments, the sum of her sufferings is really lessened; in other words, the pains of parturition are intermittent because they are not continuous, for that is all the explanation given by A. Petit. A physician whom Millot opposes, with much warmth has entered more deeply into the question, asserting that the cause of the intermittence of the pains is found in the resistance offered by the ovum to the contractions of the womb. Others have since endeavored to explain the facts as follows: when the womb contracts with much force, say they, the nerves between its different strata, or even on its inner surface, being compressed by the external surface of the ovum, soon produce a degree of numbness in them, that necessarily puts a stop to the contraction.

But the pains, in these cases, ought to be very long and very near to each other at the commencement of the labor, instead of being so fugacious and far apart, as the contractions are then extremely feeble; on the other hand, they ought, at the close, to be shorter and less frequent, inasmuch as the compression is then sudden and most violent; nor are the pains that accompany the delivery of the secundines, or the after-pains that follow delivery, and which still preserve the intermittent type, explained in a manner at all more satisfactory, under this hypothesis.

De Buffon thought that the cessation of each pain was due to the detachment of the placenta; that is to say, according to this celebrated man, the object of each contraction of the uterus is to detach a small portion of the after-birth, and as soon as this detachment takes place, the pain, like the contraction, must cease for a moment. Two remarks suffice to show the little value of such a supposition. The placenta sometimes comes away before the fetus, and the pains are not on that account less intermittent until the labor is concluded. In other cases, the placenta retains its adherence even after the delivery of the child, which does not change the intermittent character of the pains.

In stating that the cause exists in the *cessation of the contraction of the muscular fibre*, as insisted on by Millot, who thinks he has made a great discovery, we fall back again to the *petitio principii* for which A. Petit has already been censured above: this is to avoid, and not to solve the problem.

During the contraction, the blood is forced back into the torrent of the general circulation, says Dr. Dewees; the womb grows pale, and the contraction ceases; a new affluxion takes place, and the contraction immediately returns, &c.; but this explanation, which in fact is perfectly similar to the one which I have been just now opposing, is liable to the same objections, and is not at all more admissible.

In conclusion, we do not know the cause of the intermittence of the uterine contractions, any more than we do that of the contractions of the heart, the intestines, and the muscles in general, or that of all imaginable intermittence, whether functional or organic. Inasmuch as we cannot grasp a body strongly in the hand without being soon obliged to relax it, wherefore should it be supposed that the contraction of the womb does not require to be alternated with relaxation? The nature of the phenomena is similar in each of the cases; its cause must be identical; and I cannot perceive why we should with so much ardor seek for it in the one, when we have, in some measure, agreed to abandon it in the other. It is a question which will doubtless long remain unsolved, but which belongs much more to general physiology than to tokology in particular.

Saccombe, being in the country, and having nothing to occupy his time, under-

took to measure the interval between each pain from the commencement to the end of a labor, which lasted from two to three hours; and this is the result he attained. Between the first, the second, and third pains, fourteen minutes and twenty-seven seconds; from the third to the fourth, ten minutes and twenty-seven seconds; from the fourth to the fifth, eight minutes and twenty-nine seconds; from the fifth to the sixth, seven minutes and thirty-two seconds; from the sixth to the seventh, six minutes and thirty-five seconds; from the seventh to the eighth, six minutes and thirty-six seconds; from the eighth to the ninth, six minutes and forty seconds; from the ninth to the tenth, six minutes and forty-two seconds; from the tenth to the eleventh, five minutes and forty-five seconds; from the eleventh to the twelfth, six minutes and forty-five seconds; from the twelfth to the thirteenth, five minutes and forty-seven seconds; from the thirteenth to the fourteenth, five minutes and forty-nine seconds; from the fourteenth to the fifteenth, five minutes and fifty-five seconds; from the fifteenth to the sixteenth, four minutes and sixty-two seconds; from the sixteenth to the seventeenth, four minutes and seventy seconds; from the seventeenth to the eighteenth, four minutes and eighty-seven seconds; and from the eighteenth to the nineteenth, five minutes and ninety-three seconds.

B. *Dilatation of the os uteri*.—Pain is the first symptom of labor; but it is neither the most essential nor constant one; for, as has been pointed out by Levret, Denman, and Hopkins, it may be conceived, that there may be cases in which it is possible for women to be delivered without any pain, whereas, it is materially impossible for her to be so without the dilatation of the os uteri. This process of dilatation, which is wholly subordinate to the power of the uterine contractions, requires to be well understood. It is slow and not very perceptible at the commencement, but is effected with great rapidity towards the close of labor. It generally requires more time to enlarge it to the size of a crown piece, than to complete its dilatation, when its diameter is about three inches. The orifice, which is for the most part very thin and somewhat sharp, when touched at the beginning, especially in a first labor, communicates an impression like that which would be felt upon touching a ring of fine cord slightly stretched. In the latter half of the first stage it becomes, on the contrary, thicker, and sometimes forms a kind of roundish cushion, which seems to yield before the child's head, but gradually disappears when the head passes or engages in the strait. The very contrary of this is remarked in women who have had many children; the lips of the os uteri, which at first are soft and supple, still sometimes retain a thickness of several lines, even although the labor may be somewhat advanced; it is, however, only at a later period, when the bag of waters begins to form, that they begin gradually to grow thinner.

In both the above cases, the diminution in thickness is far from taking place with the same regularity on every point of the circumference of the circle. I have often seen its posterior half as thin as the edge of a sheet of paper, while its anterior semi-circumference formed betwixt the head and pubis a cushion from three to four lines in thickness. This inequality, which is in some sort natural, and almost always to be met with in various degrees, ought not to be overlooked, whenever we attempt to determine the duration of the labor: by touching the anterior half of the cervix without carrying the finger far back, one might be led to prognosticate a pretty tedious time, while another person, after having explored the opposite side, would announce that the labor is just about to come to a conclusion.

The shape of the os uteri during the process of dilatation is no less variable than the thickness of its lips. It is pretty nearly circular where it corresponds to the centre of the pelvis; but more commonly it is oval, with the broadest part turned backwards, or to one side, right or left, according as the fundus is inclined in this or that direction; sometimes elliptical, especially when the child presents

in a transverse direction; it exhibits, in other cases, certain inequalities, which depend upon its different points not having the same consistence nor the same extensibility.

All those authors who have maintained that the foetus is the efficient cause of delivery have necessarily also admitted that it is the cause of the dilatation of the os uteri. The common people, mostly, still reason in this way, and Vigarous seems to be of the same way of thinking; but, since it has been ascertained that, in the expulsion of the whole or part of a dead foetus, the os uteri dilates just as it does for a living child, this opinion, now become superannuated, has been completely rejected.

This, however, does not imply that the child has nothing to do with the production of this phenomenon, but merely that it is not the active cause of it, and can only concur in it by being under the influence of some other power.

The real cause of it is to be found in the contractions of the womb. It is of the essence of fleshy fibres to shorten themselves, and tend to approach a straight line, when they contract; the womb is composed of curved fibres, the most numerous and strongest of which occupy its fundus and body, and are principally placed lengthwise; the cervix is the weakest part of the whole organ; and the ovum is an incompressible body. Now, it is manifest that, with such a disposition, the dilatation of the cervix must commence with the contractions of the womb. The vertical and oblique fibres, by their two extremities, which are their movable points, draw the horizontal fibres to which they are attached, or with which they are interlaced, upwards towards their middle, where is to be found the real fixed point. The transverse fibres, in contracting upon the ovum, a smooth oval body, necessarily tend to slide towards its apex or towards its base; but, as they are at least as numerous above as below the middle transverse zone, it follows that the circular fibres of the inferior portion of the uterus will, in any general contraction, be found to resist, alone, the efforts of all the longitudinal and circular fibres of its superior half. This explanation, which is nearly the same as that of M. Nægèle, appears to me to cover the whole ground.

On the other hand, as the ovum can only be pushed by the concavity of the uterine fibres towards the least resisting point of the organ, it engages in the partly open orifice, and becomes a powerful though secondary cause of the dilatation of the os uteri, and in this case acts like a wedge. It is an inert force which acts in aid of a vital or organic force. Thus, it may be admitted that the ovum is depressed while the os uteri is raised upwards; in other words, that these two parts, under the influence of the same power, the uterine contraction, slide one upon the other, and that the latter must dilate in the direct ratio of the force which causes the former to descend.

At the commencement of labor, when the os uteri just begins to open, it is known to contract instead of dilating during the pain, but in such a way, notwithstanding, that it remains larger after the pain than it was before it. At a more advanced stage, when the bag of waters begins to form, we observe, on the contrary, that the os uteri dilates considerably during the contraction, and contracts somewhat as soon as it is over. The cause of this peculiarity is easily to be understood: at the commencement, the fibres of the neck still resist with great energy the action of the fibres of the body and fundus; as the womb contracts at all points at the same time, and not in one or another of its planes, as A. Leroy supposed, or in different portions of its substance alternately, as taught by some others, the orifice, instead of dilating so as to allow the membranes to engage, on the contrary contracts, as if to prevent their passing out; whereas, at a more advanced stage, when it is sufficiently open to permit the point of the ovum to lodge in it, the bag of waters unites in assisting the uterine contraction to force them to distend.

Immediately after the discharge of the liquor amnii, the head of the foetus

occupies the situation of the bag of waters, fulfils its uses, and acts upon the neck in the same manner; nearly all practitioners think this part less favorable for the dilatation than the segment of the membranes, inasmuch as it is not so even, as it does not form a tumor so equally stretched; but we shall see, in examining the subject of the premature rupture of the ovum, that upon this subject further observations should be made. It is principally from this very moment that the uterine circle is converted, in first labors, into a circular cushion of various thickness, and that the dilatation seems sometimes to diminish to such a degree as to impress us with a belief that the labor is retrograding instead of advancing.

C. *Discharge of glairy mucus.*—The term glairy or mucous discharge is given to certain flakes of matter of a very clear yellow or greenish-white color which escape from the sexual organs during labor; this glairy matter occasionally resembles white of eggs slightly cooked, and differs from the mucus of the nostrils by being less adhesive, and by forming masses or lumps which are less coherent and more albuminous. It escapes in masses or flakes which tremble like jelly, come away especially during the contractions, appear in some instances several days before the onset of labor, of which they constitute one of the most certain preliminary signs,* become more and more abundant as the dilatation progresses, and at last, in a majority of women, become tinged with blood.

Nothing is more variable than the quantity of this discharge; sometimes a few lumps only are observed, and at others very large quantities of it escape with each pain; when in small quantity or wholly wanting, the labor is said to be a *dry* one; when abundant, it leads us to believe the labor will be soon terminated. Where red striæ are mixed with it, the woman is said to have a *show*, and the bystanders think it a good sign, or a proof that the labor will be quickly over. This notion, although not without some foundation, for it is generally observed about the close of the first stage, is far from being always correct; because there are cases where the red-colored mucus does not appear at all, while there are others in which it occurs with the first pains.

Some authors have supposed that this semi-fluid matter escapes by transudation from the membranes, and upon leaving the ovum, becomes thickened in consequence of the increased temperature of the parts of generation; as if there was the least resemblance, either as to nature or appearance, between the water of the amnios and the mucous discharges! Others have believed that the fluids brought to the external surface of the ovum, meeting only with vessels of extreme tenuity whereby to penetrate within the amnios, decompose, become in some measure filtered, and that their finest and most subtle particles pass through the membranes to form the waters; while their grosser principles remain without, accumulate in the vessels nearest the internal surface of the womb, whence they are expelled during the contractions to give rise to the glairy discharges; but such an hypothesis need only be mentioned in order to show its futility. The glairy matter is furnished by the mucous membrane, and I cannot conceive why its source should have been looked for anywhere else. The vagina is lubricated with it every moment during the lifetime of the individual; many women discharge pretty large flakes of it at the approach of the catamenia; it is not uncommon to find the womb filled with it in women who die in the unimpregnated state; and in leucorrhœa and other diseased states, it sometimes exhibits the same characters, and runs off in as large quantity as during labor.

The blood mixed with it comes neither from a rupture of the utero-placental vessels, for these vessels have no existence, nor from slight lacerations of the cervix, at least most generally; for it is very common to find the bloody mucus appear before the cervix has been at all stretched: the mucus is colored with

* In a great many animals, both domestic and wild, parturition is also preceded by a discharge of mucous matter, which is sometimes very abundant.

blood in the same manner as the sputa in cases of pulmonic irritation, or as the mucous excretions of the nose in cases of irritation seated in the Schneiderian membrane, &c. Whether this blood be derived from the interior of the womb, or even from some cracks in the cervix uteri, it may be conceived that, though it ordinarily goes only so far as to redden the mucus, it may nevertheless go to a much greater extent, so as to constitute a real hemorrhage.

The use of the glairy matter is to moisten and lubricate the parts over which the child has to pass, to increase their suppleness and extensibility, and make it more easy for the ovum to slide over the surfaces. Where the discharges fail to take place, the dilatation of the os uteri is always more painful, slower, and the organs more disposed to become inflamed; their superabundance, in general, indicates great softness of the tissues, weakness, and a disposition to inertia; so that this phenomenon really deserves great attention in practice, and the accoucheur ought carefully to study its progress and its particular modifications.

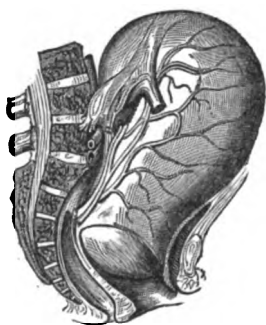
D. Bag of waters.—The name of bag of waters is given to the protuberance formed by the membranes in the upper part of the vagina during labor. A true segment of a sphere, or of an ovoid, which was compared by A. Petit to a *tymbal*, this sac varies, however, in respect to its shape, for it is generally moulded upon the opening through which it tends to escape. Round, globular, and even, when the os uteri corresponds to the centre of the pelvis and dilates in a regular manner, it is commonly elliptical when the child presents transversely. Wider behind, and to the right or left, in cases where the womb is strongly inclined in the opposite direction, it sometimes presents the appearance of a cone somewhat elongated, or of a portion of intestine, or the shape of a *sausage* or *blood-pudding*, particularly when the foetus presents by the feet, and even in cephalic presentations, as Deleurye has witnessed, or also when the os uteri is very hard at the same time that the membranes exhibit a great degree of extensibility; it has, finally, been seen to enlarge beneath the orifice, and become pyriform.

During the presence of a pain, the bag of waters is hard, tense, and elastic; after the contraction is over, it becomes wrinkled, and contracts or disappears. Constituted, like the rest of the ovum, of the *anhistous* membrane, the chorion, and amnios, its formation, according to some persons, depends upon the elongation of the membranes; but A. Petit has fully refuted this opinion, by demonstrating that the foetal tunics are scarcely extensible. According to some other writers, and particularly the last-named author, every contraction causes a small quantity of water to exude from them outwards; a vacuum is gradually effected in the amnios; and the ovum, being powerfully pressed in all directions, gradually engages, through the orifice, in the upper part of the vagina. But if this transudation really took place, the surface of the bag would become covered with small drops of water; or a kind of dew—in a word, it would become moist, during the pains; whereas, it is never drier than it is during the very strongest contractions; besides, it has already been seen that there is no analogy between the liquor amnii and the glairy discharges, into the composition of which A. Petit gratuitously supposed them to enter so readily.

The bag of waters, like the dilatation of the cervix, is produced by the contractions of the womb, and by a mechanism equally easy to be understood. By acting upon the periphery of the ovum as upon the throat of a pulley, the uterine fibres compel it to descend, while, on the other hand, the cervix, by dilating, is obliged to approach nearer to the fundus, and to leave a more or less considerable segment of the membranes outside of the orifice; the point of the foetal ovoid, lubricated with mucus, forces the orifice to open a little, as the finger, when previously covered with a peach skin turned inside out, will force the fingers of the other hand to open when we try to push it betwixt them. It would, notwithstanding, be wrong absolutely to deny the extensibility of the tunics of the foetus. On the contrary, everything proves that they may sometimes extend to a con-

siderable degree, and that it is in consequence of this elongation that the bag in certain cases assumes the form of a cone or of a pear; I merely wish to say that this property is in general very slight.

Fig. 20.



Form of the bag of waters when the os uteri is fully dilated.

Even if it be true that the amniotic tymbal is almost always curved upon a cord that is shorter than the rest of the ovum, it is also true that this peculiarity, which seems to demonstrate that the membranes have yielded at that point, is owing to another cause; any one who has had occasion carefully to open a pregnant womb has had an opportunity of being convinced that the mere weight of the ovum is sufficient to flatten it very considerably, as soon as it ceases to be exactly supported by the surrounding organs: therefore, it is quite evident that a portion of the membranes may in this state of relaxation engage very well in the os uteri, and in a very small volume, without undergoing any real elongation.

After having wholly or in part dilated the os uteri, the bag of waters, now become very large, and, besides, ill supported in the upper part of the vagina, yields to the impulsion of the liquid, and breaks; the contained fluid escapes, and the head of the child, being at the same moment pushed forwards by the same effort, stops up the passage to the rest of the liquor amnii. But this rupture is far from always taking place at the same point, or under the same degree of dilatation, or at the same stage of labor in all women. The membranes may be too dense, too thick, and too resisting, or too thin and fragile; the os uteri itself, which is sometimes very hard, rigid, and difficult to distend, is, on the contrary, in other cases, extremely soft. In the most natural and regular state of things, the sac gives way about the end of the first, or commencement of the second stage; but it may open at the beginning, or not until the end of the labor. It happens, also, sometimes, that the membranes burst either one or several days before the appearance of the first pains, or that they do not rupture at all, the ovum being forced to pass whole through the straits of the pelvis.

The perforation commonly takes place in the centre, and in that case the sac becomes instantly empty; if it happens near the edge of the orifice or high up, it collapses only imperfectly, or appears again with each return of the pains, and the fluid escapes in small quantities only. When the tumor does not open until it nearly reaches the vulva, and the rupture does not take place in the centre, the head carries a segment of the membrane along before it, and the fœtus escapes covered with a sort of hood, and is born with a *caul*.

It was formerly predicted that a child born in this way would be lucky or unlucky, according to the color of the caul; and if it swallowed its caul, previously reduced to powder, or always carried it about its person carefully enclosed in a box, it would be fortunate and always happy; that, if it lost it, it would be unhappy in everything, perhaps epileptic, constantly tormented by phantoms or infernal spirits; whence it follows, says Diemerbroeck, that the midwives seize upon a portion of this membrane as a matter of right, in order to frighten the parents, and get more money from them by selling it to them at a dear rate. How many good women in the country are still imbued with this absurd prejudice! Should the caul extend over the mouth and nose, it might, strictly speaking, hinder respiration from taking place, and perhaps cause the death of the child, as some authors have supposed; but to justify such fears as these, the lying-in woman herself must be supposed to be insensible, and to have nobody with her.

CHAPTER II.

LABOR PROPER.

SECT. I.—OF EUTOCIA,* OR SIMPLE, FORTUNATE, OR SPONTANEOUS LABOR (NATURAL LABOR OF THE FRENCH WRITERS).

In order that labor may terminate without foreign aid, a considerable number of conditions are required.

On the part of the woman, there must be no fault nor deformity in the pelvis; no serious affection of the womb, no scirrhus nor old cicatrices; the organ must enjoy a certain degree of energy; the general powers of the system must not have been exhausted, either by a profuse hemorrhage, or any long-continued disease; there must be no affection, making it dangerous for the woman to give herself fully up to the efforts she is compelled to make, and no accident must supervene during the labor.

On the part of the child, it is important that the occipito-coccygeal axis should present one of its extremities to the straits; that the fœtus should descend with the head, the feet, the knees, or the breech foremost; that it should not be hydrocephalous, gibbous, or ascitic; not of a size disproportioned to the capacity of the pelvis; that there be not two heads attached to a single trunk, or two trunks to a single head, nor two children united together in any manner whatever.

Notwithstanding the number of these conditions, it is a rare thing for them not to be met with; for spontaneous child-birth forms a large proportion of the sum total of labors.

We find, in Merriman's Synoptical Table, that, out of 1800 cases, 1746 might have terminated spontaneously, since the child presented by the vertex in 1654 instances, four times by the lower extremities, twenty-three by the face, forty-two by the hip, and that in twenty-three cases the labor was only regarded as dystocical because they were multiple pregnancies.

20,357 labors took place at the *Maternité*, at Paris, from 1797 to the end of 1811; of these, 20,183 were natural.

Out of 1897 that took place under the superintendence of Dr. Bland, 1860 were brought to a conclusion by the hand of nature.

It is seen, therefore, that, at the *Maison d'Accouchement* at Paris, difficult labors have occurred in the proportion of one to sixty-two; and at the Westminster Dispensary and Middlesex Hospital, according to Merriman and Bland, out of forty-three labors, forty-two terminate spontaneously.

Madame Lachapelle, in her new tables, divides the labors that have fallen under her notice into two periods: the first, extending from the first Germinal, year IX, to the 31st December, 1811, comprises 15,662 cases, of which 15,380 were spontaneous, and 272 difficult; the second, which extends from the 1st of January, 1812, to the 31st December, 1820, comprises 22,243 labors, of which 21,974 terminated without any artificial assistance, and 269 by the assistance of art.

According to Boer, there were 958 cases from September, 1787, to the same period in 1790, in the Obstetrical School of Vienna; and of this number seven-

* Eutocia, from *eu*, well, happily, easily, and *τὸς*, child-birth, delivery.

teen required turning, the forceps, or the perforation of the head; from September, 1790, to September, 1791, there were eighteen cases of dystocia out of 950 labors; from September, 1791, to September, 1792, out of 1015 labors, there were eight requiring turning, and seven the forceps; from the 1st January, 1801, to 31st December, 1802, among 2234 labors, thirteen were concluded by turning, eight by forceps, and two by perforation of the head; from January 1st, 1803, to December 31st, 1805, out of 2399 labors there were five cases of turning, eleven of application of the forceps, and three of perforation; in 1806, out of 2030 cases, seven required turning, two the forceps, and one the perforation of the head.

At Heidelberg, out of 1296 labors mentioned by M. Nægele, 1230 were natural, and sixty-four not natural, which gives the proportion of one to twenty; while the review by Boër exhibits, out of a total of 9590, only 102 requiring turning, the employment of the forceps, or the perforation of the head; which makes about one case of dystocia in ninety-five.

The same variations may be found in almost all the obstetrical tables published to the present time.

G. M. Richter announces but forty-three difficult cases in 2571 deliveries observed at the Hospital of Moscow; whilst in his private practice he notes sixty one in 624. In the first case one in forty-six, in the latter one in ten.

Of 3182 cases, Troccon of Bourg notes but seventy difficult cases, which is one in forty-six.

M. Merrem, on the contrary, speaks of twenty cases of difficult labor in 157 deliveries which occurred in Cologne in 1826, which is one in eight.

We find also, from the tables of Siebold for 1827, that eighteen cases were assisted out of 137, which is one in seven and a half.

M. Kluge gives twenty-six out of 268, or one in eleven.

Out of 17,000 cases observed at the Hospital at Prague, from 1789 to 1827, M. Killian says that artificial assistance was employed 187 times, or one in ten.

At Dresden, in 1827, M. Carus cited thirty-three cases of difficult out of 220 labors, or one in seven.

Of 398 cases, Mr. Hart, of Dublin, noted thirty-two, and Mr. Cusack twenty in 313; which makes one in 130 of the first, and one in sixteen of the latter.

Dr. Gregory gives thirty out of 887, occurring in the Hospital Combe, or one in thirty.

Of 240 labors observed at the Hospital Saint Louis, by M. Papavoine, eleven offered difficulties, or one in twelve.

We see, also, that the practice at the school at Metz was very active. A statement of Morlanne shows that seventeen cases out of fifty required assistance; in another year, there were eleven out of forty-nine; at another period, there were twenty out of sixty-eight; in a fourth series, there were twenty-five in 129, which makes seventy-three difficult cases in 296 deliveries.

M. Pigeottes, on the contrary, only applied the forceps twice and has lost no woman at the Clinic of Troyes in 1362 cases, or one in 681.

We see but ten difficult cases out of 216, mentioned in the report as occurring at the Clinic of Liège, and ten in 275 mentioned by M. Ramoux as occurring at the Clinic of Colmar; one in twenty-one in the one, and one in twenty-six for the other.

M. Riecke says that, out of 219,353 labors at Wurtemberg, from July, 1821, to July, 1825, 7949 required assistance, or about one in twenty-three.

The proportion announced by M. Mazzoni is one in seventeen; and that of Mr. Waller is one in forty-six.

But these proportions must be understood only as showing the practice of the authors who have published them, and not that occurring out of the public establishments. The discrepancies now existing in reports on this head are already suf-

ficiently great; as may be evident upon reference to the London and Paris reports, and those of M. Boer, and those of the clinic at Pavia, for, according to M. Lovati, out of sixty-seven labors, twenty-two required assistance. However, the proportions found in private practice are still more variable, for, in great cities as well as in the country, the resources of art are called in, at least in one case in six, by some individuals, whilst others employ them only once in ten, twenty, thirty, or even sixty, eighty, or one hundred cases.

On this subject I think it important that we should not confound the possible with the useful. Although Boer's work proved that only one case out of one hundred and thirty-two labors was terminated by the assistance of art, it does not by any means prove that it would not have been better to have recourse to it in some other of the one hundred and thirty-one cases. Is it not certain that in many cases where parturition may, rigorously speaking, take place spontaneously, nature would, by a proper kind of assistance, conclude the function more happily both for the mother and the child? As to Merriman and Bland, who mention one case of dystocia out of forty-five, it is not proved that they were not in a hurry to act in many cases where the organism, if left to itself, would have fully sufficed for its own welfare; besides, everybody knows that patience is not the prevailing quality of English practitioners. Be this as it may, if the results obtained in the hospitals of Vienna, London, and especially Italy, be taken as the extremes, it seems to me that we may admit those of the *Maternité* at Paris to be the mean term, and then it will appear that the active co-operation of the accoucheur will be useful in one out of fifty cases.

Now what is the reason that a different result is found to occur in private practice? Ought dystocia to be met with more frequently in women in easy circumstances, who live well in their own families, than in the poor, who are tormented with fear or remorse, and who go to the hospitals to be confined? No, doubtless; for everything concurs to increase the number of difficult labors in the hospitals, and diminish it in private practice. Deformed pelves and all sorts of diseases of the genital organs are most frequently to be met with among the poorer classes of women; many women, who would otherwise have remained at their own houses to be delivered, go to lie-in at the hospital, because they are of a bad conformation, or because they are fearful of having a dangerous labor; many others go there while in labor, because they are found, by the person originally called in, to need the assistance of art, and because they will have an opportunity of receiving that assistance better than they would at home.

But in the hospitals, with the exception of Oslander, who brags that he has rendered assistance in four hundred cases out of seven hundred in the Institute of Gottingen, none, in general, except skillful persons, are appointed, who do not act for the mere pleasure of doing so; who repose in nature all the confidence that she deserves, and do not vainly interfere to assist her to do better; who know how to apply in proper season, and only where they are indispensable, or at least evidently useful, the resources of an art whose fundamental principle is, always to preserve, and never to destroy, except in cases of absolute necessity. But out of those public institutions, how many imprudent, ill-timed, unskillful, or rash manœuvres!

However, it must be confessed that the proportions between the different kinds of labor must of necessity vary from circumstances wholly accidental. Thus, of two practitioners who are equally skillful and equally circumspect, one may attend several hundred labors without being obliged to give any assistance to nature; while the other may be several times obliged to have recourse to artificial means. Since I began carefully to notice the facts that have fallen under my own observation in tokology, I have found a very great difference between what has occurred at my amphitheatre and in my private practice. Out of the five hundred and fifty labors that took place in the *Hospital de Perfectionnement*

while I had charge of it, and in my own amphitheatre, only eight required any assistance; in my private practice, on the contrary, out of less than five hundred cases, I had sixty cases of dystocia; which gives for the former only one difficult labor in upwards of seventy, and for the latter, so to speak, one for every eight labors. Such a disproportion is, however, not difficult to account for; at my public hall, and at the hospital, we received without distinction all the women who presented themselves, without any of them, except two, having previously undergone any examination; while the cases of dystocia that fell under my notice elsewhere were almost all procured for me by my brethren, or by midwives. Such variations in the proportion of labors requiring assistance, depend upon causes so different that they have been already described under a separate head. Their distinctions were more complete in the last two centuries than at the present time; for while Courtin admits but one difficult case in a thousand, we see that Dionis, while refuting Hecquet, maintains that the assistance of the accoucheur is necessary eight hundred times in a thousand.

ART. I.—OF NATURAL EUTOCIA (SIMPLE OR SPONTANEOUS LABOR, THE HEAD OF THE CHILD PRESENTING).

What I have said concerning the attitude and position of the foetus in the womb, makes it sufficiently evident, that the child ought properly to present its cephalic extremity to the straits of the pelvis, and that the cases where it descends in any other way should be regarded only as anomalies. It was correct, therefore, in Hippocrates and most of the ancient authors, not to give the title of natural labors except to those in which the head of the child came first, and to call all labors where the feet, the breech, or knees presented, non-natural. The moderns, having rejected this doctrine, depend upon their having misconceived the acceptation of the terms: the word *natural* is admitted by them to be synonymous with *spontaneous*, and consequently that labor, where the pelvic extremity presents, ought to belong to the class of natural labors.

There is no doubt that the principles taught by the father of medicine have been the cause of important errors in practice, by leading practitioners to deliver by the head when it did not originally present, and in denying the possibility of a labor terminating alone, where the feet present; but, although they abandoned these ideas, have not the authors of the last century replaced them by others equally incorrect? Is it right, with Dionis and A. Petit, to say that the foetus may be extracted with as much or more ease by bringing it away by the feet, than if it descends with the head foremost; and that it is almost a matter of indifference, as to the result, whether the cephalic or pelvic extremity presents? I do not think so, and I dare to say that such a way of thinking would be scarcely less dangerous in practice than the ancient doctrine. There is no position of the child in which the labor has not sometimes terminated alone; and yet it has entered into no one's head to call a shoulder presentation, for example, a natural one. If a dystocia takes place, it is not because the child is in this or that position, but because the interference of art becomes indispensably necessary; a labor may be fortunate, and simple, or spontaneous, although the foetus presents with its pelvic extremity; but strictly speaking, the positions of the head are alone natural or normal. It appears to me, that we may avoid confusion on this subject, by ceasing to confound the presentations of the foetus with the labor, properly speaking. The presentation may be natural, and yet the labor may be difficult; while, on the contrary, with an unnatural presentation, the delivery may occur spontaneously and without difficulty.

Delivery by the cephalic extremity contains two very distinct genera: in the first the summit of the head presents; while in the second, the face or some other part of the head offers at the straits.

§ 1. PRESENTATION OF THE VERTEX.

1664 times in 1800 cases (Merriman); 1792 times in 1897 cases (Bland); 19,730 in 20,357 cases (Madame Boivin); 14,677 times in 15,652 cases (Madame Lachapelle); 20,698 times in 22,243 (Id.); 1210 in 1296 cases (Nægèle); 61 in 67 (Lovati); 392 in 400 (Velpeau); 920 in 1000 (Smellie, vol. i. p. 204); 94 in 100 (Nægèle, § 252); 125 in 132 (Clinic of Strasburg); 114 in 153 (Merriman); 132 in 137 (Siebold); 257 in 298 (Kluge); 439 in 452 (Mazzoni); 266 in 275 (Ramoux); 49 in 53 (Pacoud); 10,262 in 10,742 (P. Dubois); 214,134 in 219,253 (Riecke).

The presentation of the vertex is incomparably more frequent, as may be seen above, than all the others. Is anything further wanting to prove that it is the only natural one, that which the organism always tends to produce, when nothing arises to interfere with the regular accomplishment of the grand act of reproduction? In this presentation the posterior fontanelle tends to place itself in the centre of the pelvis. The principal diameters of the straits are adapted to the occipito-bregmatic and bi-parietal diameters. The occipito-mental diameter, and the occipito-bregmatic circumference should be parallel to the planes of the openings of the excavation, and to the axis of the pelvis. Burton and Lemoine, who insist that the long diameters of the head correspond to the short diameters of the pelvis, have not probably reflected on the singularity of the assertion, and it is not without surprise that we see it again advanced by others nearer to us. Van Solingen, who thinks he gave rise to the contrary opinion, and who declaims with ability against the French practitioners in his reply to M. Capuron, would be equally wrong, unless we take his words literally. To advance with him, indeed, that the small dimensions of the head are in correspondence with the most favorable of the pelvis, is evidently to say the same thing that Burton does. We cannot maintain, with the older writers, that the anterior fontanelle is placed at the centre of the superior strait. The central point is not even the middle of the space which separates the two fontanelles, as Smellie thought; nor the centre of the sagittal suture, as Burns admits; nor the posterior fontanelle, with a considerable portion of the right or left parietal bone and sagittal suture, as Nægèle believes. Indeed, the head presents at the straits by its smallest and not by its occipito-frontal circumference. As to the diameters of this circumference, if their dimensions were not nearly equal, it cannot be doubted that the largest would tend to be placed in correspondence with the most extended measurements of the planes of the pelvic cavity. To discuss this question further would be to dispute only about words. These general relations are always to be observed in regular positions of the vertex; but the occiput is far from looking to the same point of the pelvic circle in all cases, whence have arisen the various *positions* at present admitted in tokology.

Antecedently to the time of A. Petit, Solayrès, and Baudelocque, accoucheurs were content to say that the occiput had come in front or backwards, and the face was turned towards the sacrum or towards the pubis; and this old method of considering it, which M. Delpèch defends, is still generally adopted in England, in Germany, and in most foreign countries. It is therefore in France particularly, and almost only in France, that attempts have been made to subject labors to the methods followed in natural history. But upon this, as upon all other subjects that are merely matters of convention, it has happened that the same fact has not been looked at in the same light by all observers. In the opinion of some, we ought to admit six positions of the vertex; according to others, the number may be extended to twelve, and even to twenty-four; many think that there should be only four, and some not more than two. Again, those who agree in respect to the proper number, differ in regard to the proper method of counting them or locating them. For example, Madame Lachapelle, who, like Baudelocque and

PLATE VI.**PRESENTATION OF THE VERTEX.**

FIG. I.—FIRST POSITION AT THE SUPERIOR STRAIT.

FIG. II.—OCCIPITO-ANTERIOR POSITION AT THE SUPERIOR STRAIT.

FIG. III.—OCCIPITO-POSTERIOR POSITION IN THE EXCAVATION.

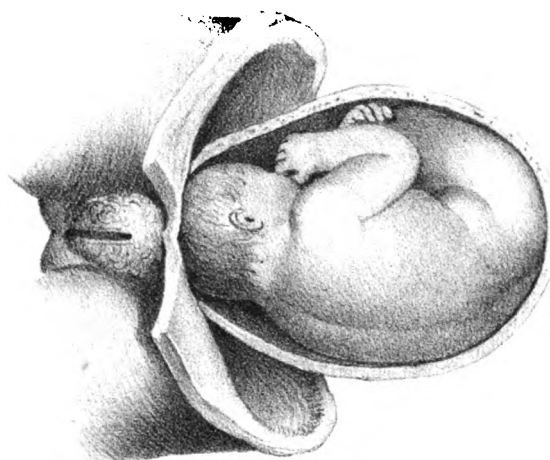


Fig. 1.



Fig. 2.



Fig. 3.

de la Tourette, admits of six positions, does not adopt the two antero-posterior positions of that author, but in place of them establishes two transverse positions.

In a theoretical point of view, it cannot be denied that the vertex may present itself to every point of the circumference of the superior strait, and consequently, that an infinite number of positions may be established, if we choose; but the question is, how many of them would it be *useful* to adopt in practice, which are those we ought to *study* with particular care, and not how many we *might* admit. In the first place, it is evidently superfluous to suppose there are more of them than there are points corresponding to the ends of the four principal diameters of the pelvis; therefore, it seems that the number established by M. Flamant, and which unites the classification of Baudelocque with that of Madame Lachapelle, might be considerably reduced. In fact, the occiput scarcely ever presents in more than two ways at the inferior strait; in one, it looks forwards and lodges under the arch of the pubis; in the other, it is turned backwards, and presses the anterior edge of the perineum forcibly backwards. The same thing occurs at the superior strait, except that the occiput then looks generally either to the right or to the left.

Agreeably to this observation, I have thought that all the presentations of the vertex might, without inconvenience, be referred to two fundamental positions: one, in which the occipital protuberance answers to some one point of the anterior semi-circumference of the pelvis; the other, where the same part is turned towards its opposite portions.

The *occipito-anterior* position comprises the first three positions of Baudelocque, or the first two of MM. Maygrier, Capuron, and Dugès, and of Mesd. Boivin and Lachapelle. The *occipito-posterior* position naturally includes the fourth, fifth, and sixth of Baudelocque, or the third and fourth of the authors just now mentioned.

It is evident that the first, second, and third have one common termination, and that their mechanism is in almost all respects similar. It is also undeniable that the fourth, fifth, and sixth do not differ one from the other. I do not perceive, therefore, the utility in any way of admitting these varieties otherwise than as so many shades of the two fundamental positions, to which all others must of necessity be at last reduced. As to these, I think that no one ever attempted to confound them; their mechanism is so different, that the English accoucheurs, such as Burns, Merriman, and Bland, bestow the title of natural labor only upon the occipito-anterior position, while, according to them, the occipito-posterior position belongs to the class of preternatural labors. I hasten to add, nevertheless, that, in thus admitting this classification at the superior strait, as I have done in the first edition of this book, and also in the second edition of the "*Dictionnaire de Médecine*," we are likely to confound the starting-point with the escape of the head.

At the *superior strait*, the relations of the head with the pelvis differ materially from those which have been indicated. In place of looking directly forward or backward, the occiput then turns most frequently to one side, so that many modern authors have rejected as impossible the occipito-pubic and occipito-sacral positions, which are admitted by Baudelocque at the commencement of labor.

It is more conformable with observation to adopt the terms *right* or *left* half of the pelvis when speaking of the superior strait, than those of the *anterior* or *posterior*, which I think more suitable for the inferior strait. Ould, who was opposed by Burton, was the first, I believe, who perceived that the head engages crosswise in the superior strait. The chin, he says, always turns towards one shoulder at the commencement of labor, in place of looking backwards. The opinion was still more formally advanced by Smellie, who insisted that the occiput, at first placed crosswise, does not turn forward until it reaches the inferior strait. Denman maintains, also, that one ear looks forward and the other backward, even when the vertex passes the strait. Burns goes farther, for he insists that the

head does not turn until it reaches the inferior strait, and that it remains cross-wise, and is only slightly turned towards the acetabulum even when it rests on the floor of the excavation. M. Chevreul said as much in the year 1792, for he described in the first place the positions of the vertex according to the transverse diameter, the occiput being to the right or left.

This doctrine, nevertheless, had scarcely attracted attention in Europe, when Nægèle, and after him several other German accoucheurs, twelve or fifteen years since, made it a subject of special study. All that Lambin and Madame Lachapelle have said on the subject, had no effect on the minds of the French writers. But all at the present time believe that it will soon occupy the position, among us, which it deserves. It is necessary, however, to remark that in Germany it is not everywhere understood in the same way. M. Kilian, for example, who admits a right or left occipito-iliac position, as do Smellie and so many others, and as P. Dubois has wished to establish, thinks that the occiput turns almost indifferently forwards or backwards, if it does not remain towards the side while passing through the excavation. M. Ritgen contends, on the contrary, that the points of departure of the two principal positions correspond to the fourth and fifth positions of Baudelocque; while, according to the theory of Nægèle, the occiput presents to the left and a little in front, or to the right and a little behind. Bodin, who admits only two natural positions of the head, places them also in the direction of the oblique diameters very nearly as in the first and second positions of Baudelocque. Titsing is still more explicit in one of his letters to Herbiniaux. The head, says he, always descends along the side, at one time towards the sacrum, at another behind the body of the pubis; and the occiput does not turn forward to engage under the arch of the pubis until it has nearly reached the coccyx.

The attentive observation of a certain number of facts does not permit me to reject or admit absolutely any of the shades of Ould's opinion, against which M. Capuron has arrayed himself, and, as I conceive, with reason. I think that I may state that at the superior strait the occiput looks most frequently to the left and forwards, as Nægèle maintains, but when turned towards the right side, it is less frequently directed towards the sacro-iliac symphysis than this author says; and that it is also inclined forward in the greatest number of cases. When in the excavation, it is inclined rather in the direction of the great sacro-sciatic openings, according to M. Ritgen, especially on the right side, unless there is deformity. Moreover, the anatomical disposition of the pelvis renders this double peculiarity almost inevitable. While the head is at the abdominal strait, indeed, the force which it receives naturally pushes the largest portion in the direction of the great diameters of the circle. Now it is evidently largest in front and at the side towards the ischio-pubic juncture. Beneath the psoas muscle, on the contrary, the region of the sciatic openings is the part which best allows the descent of the salient points of the head. Lower down, in fine, the occiput is obliged to turn in front to gain the arch of the pubis. I find, in consequence, that M. Bachart, who refutes the hypothesis of Nægèle and his countrymen, is wrong on this point, and that the transverse position of the occiput is not an anomaly, as he supposed. It follows, also, that, if M. Carus laughs at the professor of Geissen, who places the occiput at first posteriorly, and at the professor of Heidelberg, who maintains that during many hours he held his fingers in the vagina to follow the movements of the head, it is necessary to pay attention to these different peculiarities.

As the occipito-iliac positions cannot terminate until converted into occipito-pubic, or occipito-sacral positions, I will not insist upon them as a class, but will only speak of them as a variety of the others. Thus the expressions *occipito-anterior* and *occipito-posterior* should extend to the passage of the head through the inferior strait; while the terms *occipito-lateral* are applicable to the positions

at the superior strait and in the cavity of the pelvis. We may insist in vain that it is obliquely, and not directly, that the head passes from the pelvis from before backwards. It is evident that the occiput must pass under the pubic arch, or in front of the posterior half of the strait.

1. *Occipito-Anterior Positions.* — 1634 in 1800 (Merriman); 19,370 in 20,517 (Madame Boivin); 20,268 in 22,243 (Madame Lachapelle); 60 in 67 (M. Lovati); 80 in 85 (Clinic of Strasburg); 46 in 53 (Pacoud); 2341 in 2410 (Trochon); 130 in 132 (Siebold)

Many foreign practitioners think that the occipito-anterior position is the only one we ought to abandon to the resources of nature. The causes of its great frequency are wholly physical, and easily to be understood. The head is the heaviest part of the fœtus; the plane of the neck of the womb is always lower than that of the fundus; the head, therefore, ought to incline constantly towards the cervix uteri. The posterior half of the head is much more weighty than the anterior half. The weight of the hinder part of the trunk, during the intra-uterine life, is much greater than that of the anterior portion. When the woman is standing up, sitting down, or kneeling, and even when lying on her side, the anterior wall of the womb is much more inclined towards the cervix than its posterior wall: the back of the fœtus will, therefore, more frequently be found turned towards the front of the mother than towards her back. In quadrupeds, the young are often found to have their bellies downwards, and almost always come head foremost, although the womb is lower than the vulva; but it is to be observed that the abdomen in these species weighs most, and the head least. Another no less powerful cause of the frequency of this position is found in the proportional dimensions and inclinations of the head and pelvis; the abdominal strait being much larger in front than behind, and strongly inclined towards the pubis, it is quite natural that the occiput should commonly assume this direction. The back of the fœtus being turned in front even up to the close of labor, causes a twist in the neck whenever the occiput looks to the side or posteriorly, and gives it a constant disposition to turn around under the arch of the pubis. The small extent of the anterior wall of the pelvis, and the open space in front, concur to effect the same end. In this point of view, M. Ritgen certainly goes too far when he says that the soft parts have more influence than the pelvis itself, in directing the course of the head. The cause which so frequently directs the occiput towards the anterior half of the circle of the inferior strait is not then more difficult to comprehend than that which makes the head descend first. This position, either primitive or secondary, tends to prove, whatever may be the manner in which the head engages at the superior strait, that in all instances the posterior surface of the child is supported against a portion of the anterior region of the uterus. If, on the contrary, the fœtus has the back turned posteriorly or entirely to one side, this could not occur, or, if it were to, it would not be as a necessary result of the natural progress of the labor. Although, strictly speaking, this includes only the occipito-lateral positions which are slightly turned anteriorly, it will be found, nevertheless, that they are rather influenced by the direction of the dorsal surface of the child than by the manner in which the head engages in the superior strait.

The occipito-iliac positions which are most disposed to change into occipito-anterior positions being characterized by the inclination of the occiput forward, I will continue to designate them by the name occipito-acetabular.

A. *First Variety. Left Occipito-Acetabular Position.*—1st position of Baude-locque, Maygrier, Mesdames Boivin and Lachapelle; 15,809 in 22,243 (Madame Lachapelle); 15,693 in 20,517 (Madame Boivin); 36 in 67 (Lovati); 101 in 132 (Siebold); 73 in 84 (Clinic of Strasburg); 214 in 256 (Kluge); 114 in 149 (Merriman); 70 in 100 (Nægèle, § 265).

In this position the back of the fœtus looks towards the front and left; its abdomen towards the back and right.

The occiput is placed behind the corresponding ileo-pectineal eminence much more frequently than behind the acetabulum, and the top of the forehead or the anterior fontanelle, rather than the forehead properly so called, looks towards the right sacro-iliac symphysis. The right side is to the right and in front, and the opposite one is behind and towards the left.

Pointed out for the first time by Solayrès, its great frequency seems to depend upon the rectum being in pregnancy commonly filled with feces, which forces the forehead to incline towards the right side; such at least is the opinion of accoucheurs in the present day; an opinion which, besides, seems to be sustained by direct observation, since M. Dugès has seen the fœtus in Baudelocque's second position in two women who had the rectum on the right side: but this point is worthy of new researches. The obliquity of the uterus and the natural direction of the locomotive and respiratory efforts would give, I think, a more satisfactory explanation of this fact. The dorsal surface of the fœtus, continually resting on the depending region of the uterus, cannot turn toward the right groin without reacting on the head, and directing it to the left. If the occiput inclines to the iliac fossa, it is because the strait offers, at the side and forward, a sort of space, which the forehead does not meet with posteriorly in consequence of the pressure of the psoas muscle, rather than of the rectum. The same disposition also causes the head to present by the right side of its summit, rather than by the middle of the vertex, and the bi-parietal diameter to offer obliquely from above downwards, and from left to right, rather than parallel to the oblique diameter of the strait.

In this position the head of the child does not pass through the pelvis without undergoing four particular motions: 1st, flexion; 2d, rotation; 3d, extension; 4th, restitution.

1st. *Flexion*.—Immediately after the rupture of the membranes, the uterine contractions must necessarily press the several parts of the fœtus upon each other; being pressed from above downwards, the spine causes the head to bend forwards so that the occiput sinks towards the centre of the pelvis, and the chin is squeezed more or less firmly against the breast. This flexion movement does not seem to have been well understood, even by the most esteemed authors. They teach us that, antecedently to the very first contractions of the womb, the head should be disposed in such a manner, that its occipito-frontal and bi-parietal diameters should be parallel to the oblique diameters of the strait; whose axis would then be represented by the vertical diameter of the fœtus. According to them, the object of the flexion motion would be to alter all these relations; that is to say, to compel the occipito-mental and occipito-bregmatic diameters to assume the places of the vertical and occipito-frontal diameters, which would be much more favorable. In order that the above might be correct, it would be necessary for the chin, during pregnancy, to be habitually remote from the breast, which it would not approach until the period of labor, otherwise the occipito-frontal diameter cannot be parallel to one of the diameters of the pelvis; but it is well known that the fœtus, in the natural state, is always doubled up, and that its chin is pressed upon the sternum. The head, covered by the thinner portions of the uterus, descends in many women low down in the passage many weeks before labor comes on. This is a fact which I have frequently established, and which has also attracted the attention of M. Ritgen. Baudelocque has already pointed it out, and M. Stoltz has, on his part, found a proof of it on the dead subject. The flexion motion, therefore, really takes place long before the commencement of labor, and instead of being wholly effected, is only a little increased during labor.

In this way the vertex, by being depressed, soon corresponds to the centre of the superior strait. The occipito-bregmatic diameter is then parallel to the oblique diameter, which extends from left to right, and from front to rear. The

bi-parietal diameter represents the other oblique diameter. The occipito-mental diameter is parallel to the axis of the pelvic circle. The occipito-bregmatic circumference corresponds to the plane of the strait, which it tends to pass obliquely from left to right, and from above downwards, and from behind forwards. The sagittal suture extends obliquely from left to right, and a little from before backwards. The right branch of the lambdoidal suture looks to the left cotyloid cavity, while the left branch extends towards the corresponding sacro-iliac symphysis. The coronal suture, being turned towards the right iliac fossa, has its extremities directed towards the sacro-vertebral angle and right acetabulum. The occipital fontanelle is to the left, and in front, a little nearer to the ischium, or body of the pubis, than to the promontory of the sacrum. As to the anterior fontanelle, it is so elevated, at the side of the right posterior symphysis, that the finger cannot often reach it without difficulty.

2d. *Rotation*.—In this state, the head is disposed in the best possible manner to pass without difficulty through the upper strait; by successive pains it is forced to descend a little; it reaches the excavation, and being soon stopped by the floor of that cavity, it executes the rotation or pivot motion; that is to say, it turns upon its great axis, the occiput sliding upon the left anterior inclined plane, from behind forwards and from left to right, so as to place itself behind the symphysis or under the arch of the pubis, while the forehead slides from right to left and from before backwards on the right posterior inclined plane, so as to get into the hollow of the sacrum. This is the moment when the sacral plexuses are most forcibly compressed, and when most women are affected with cramps in the legs and thighs.

If we may believe M. Nægele, it is the right parietal bone, and not the vertex, that corresponds to the centre of the strait, so that the finger will come in contact with its protuberance, and not the posterior fontanelle. The head thus passes the strait, the two fontanelles being nearly on a level. The sagittal suture is carried further back, and is a little higher than the parietal protuberance, while the right ear is pressed down even with the strait. Having reached the excavation, it continues to progress from the side. The posterior superior angle of the right parietal bone gradually approaches the vulva, where it is soon followed by the right branch of the lambdoidal suture. The other branch of this suture corresponds with the left ischio-pubic ramus. The rotation is not completed until the moment when the head clears the vulva.

Guillemot, Gardien, and Burns, on the contrary, maintain that the left parietal bone descends first, that it passes over the whole posterior region of the excavation, and reaches the floor of the pelvis, before the other parietal bone becomes engaged: M. Capuron, and Mesdames Boivin and Lachapelle, have verified the same thing, but only in a few cases. Both of these opinions are partly true, and partly false. If it is true that, at the commencement of labor, the right parietal protuberance may be much more depressed than the left, as M. Nægele has stated, and as M. Stoltz also admits, it is in great part due to the fact that the anterior border of the pelvis is thoroughly inclined forward, and that, while in the womb, the body of the fœtus is bent to the right. The transverse axis of the head is obliged to be considerably depressed at its right end before it can be placed in correspondence with the plane of the strait, but this extremity never descends in the normal positions, so as to correspond with the axis of the pelvis. For, could it be otherwise, it would be necessary that the left parietal protuberance should be placed above and in front, so that the bi-parietal diameter would represent the axis of the superior strait. Now, I do not believe that M. Nægele himself would like to defend such a supposition. The finger being obliged to follow the direction of the vagina, to reach the head, strikes indeed against the right parietal bone, but it does not by any means happen that the middle portion of this bone is turned downwards and backwards.

M. Guillemot was wrong in supposing that the right parietal bone at first

advanced less than the other, if it does not even progress most; but he appears to me to have reason for the remainder of his statement. When the head is once fairly engaged in the superior strait, the left half is the only portion which seems to descend; we may have an idea of the movement which it then executes when we suppose that the bi-parietal diameter, which is almost immovable in front, and to the right behind the pubis, and below the strait, is gradually carried from above downwards, and from the sacro-iliac symphysis towards the left side of the sub-pubic arch, by its posterior extremity. The length and curvature of the pelvis posteriorly render this movement, which represents a fourth of a circle, in some respects inevitable. It appears that Solayrès has already understood this.

The tumor of the scalp, which is observed on the head of the infant, does not always have its seat on the parietal bone alone. I have often found that it corresponds with the centre of the posterior fontanelle. Besides, this tumor plainly indicates the region of the head which has not been pressed upon. This point is necessarily that which is directed for the longest time away from the side of the vagina.

Now, according to the hypothesis which I have adopted, it is only the right side of the vertex, and sometimes the whole vertex, which supports this compression, from the commencement of the labor to its termination. It is then with reason that M.M. Nægele and Stoltz have given this tumor as one of the best means of recognizing in what position the head has presented.

Observation proves to me, as to Burns, Nægele, and Stoltz, that rotation seldom takes place before the head reaches the inferior strait, but I am convinced that it is completed at the moment when the head passes the bony circle, instead of being completed when at the vulva, as they believe. If the point of the cranium, which the finger meets with at the commencement of labor, is the parietal angle, rather than the fontanelle itself, it is caused by the right obliquity of the body of the child. Thus, as M. Mazzoni remarks, the inclination of the uterus to the right forces the head to present in an oblique direction, and the right parietal bone shows itself first. I will add that the see-saw movement executed from above downwards, and from left to right, by the bi-parietal diameter, causes the right parietal bone to be placed, and even fixed, in the inferior strait, under the corresponding ischio-pubic side of the arch, a long time before the other parietal bone becomes engaged or arrested, if it is not at the moment of each contraction.

Thus, the head becomes engaged by the vertex at the superior strait. The posterior fontanelle, at first turned a little in front, is often inclined backwards in traversing the excavation, which does not prevent it from at last gaining the sub-pubic arch. The right parietal bone, being lower down at the commencement than the left, remains soon almost immovable behind the body or right branch of the pubis. The other follows just as the occipito-bregmatic circumference becomes engaged in the inferior strait. The rotation which takes place only in the inferior strait is completed during a contraction, but is immediately afterwards partially lost up to the moment when the vertex, pushed down by each pain, enters the lips of the vulva. In order for it to persist, it is necessary for the parietal protuberances to have escaped from the passage, or that they should not be able to slip up again so far as the ischium. M. Stoltz, who has observed this movement, is, I think, wrong in maintaining, with W. Kintisch, or rather with Piet, who is the real author of the *diatribe* published under the name of Kintisch, that the head remains oblique even to the end of labor, and that it traverses entirely the bony passage in the direction of the oblique diameter, the diameter which he considers longest. But, as the articulation of the coccyx is not rigid, this bone is thrown back enough during labor to draw upon the sciatic ligaments, to diminish the oblique, and to increase considerably the antero-posterior diameter.

3d. *Extension*.—Hitherto, the flexion of the head has gone on increasing; henceforth it diminishes: the extension movement is about to begin; as it approaches the inferior strait, the occiput rises, and by degrees causes the chin to abandon the front of the thorax: instead of continuing to bend forwards, the head tends to turn over backwards, in order that the occipito-mental diameter may be brought into parallelism with the axis of the inferior strait, without hindering the rest of the trunk from still following the course of the central line of the superior strait; the rectum and neck of the bladder, being now more forcibly compressed than before, give rise to a straining, and tenesmus; the womb and abdominal muscles contract more violently than ever; the perineum distends, elongates, grows thin, and in this way prolongs the posterior wall of the pelvis to an extent of from three to four inches. The head, being once engaged in the inferior strait, is no longer in the same relation to the diameters as before. Yet it is well to observe that its great diameter and occipito-bregmatic circumference have not undergone any change of this sort, and that below as well as above they still represent the plane and axis of the strait. But, instead of being situated obliquely, the bi-parietal and occipito-bregmatic axes are so situated that the former corresponds to the direction of the bi-sciatic diameter, and the latter to that of the coccy-pubal diameter. We cannot, however, dispute that they sometimes come out diagonally, as Solayrès and M. Stoltz say, or by the see-saw motion which the bi-parietal diameter naturally executes in the excavation. I only say, that if it is true that the two parietal protuberances engage, one after the other, it is also true that they most frequently escape together.

As the rotation takes place only at the expense of a twist of the child's neck, and not of its whole body, the shoulders retain their primitive direction at the superior strait, so that their great diameter is parallel to that oblique diameter which proceeds from left to right, and from behind forwards.

The efforts of the woman are now redoubled, the head gradually engages in the vulva, its back part being forwards, and slides down the plane presented by the anterior surface of the coccyx and extended perineum, which plane is strongly inclined forwards; the great labia are slowly effaced, and grow thin from their perineal commissure towards their pubal extremity; the nymphæ are forcibly pressed in an upward and lateral direction, but they do not unfold; they could sooner be torn and separated from the inner surface of the vulva; sometimes even the skin of the upper part of the thighs yields, so as to assist the pudendum and perineum in forming the sort of casque, with which the head remains partially covered, until it escapes entirely from the pelvis; the parietal protuberances at length pass through the bi-sciatic diameter, and the head, now arrested by the resistance of the soft parts only, is soon completely expelled. Whilst it is passing through the vulva, the posterior end of the occipito-bregmatic diameter continues to rest under the symphysis pubis, as upon a transverse axis, and rolls from behind forwards, as the occiput, the sagittal suture, the parietal protuberances, the anterior fontanelle, the frontal bone, the orbits, the nose, the mouth, and chin are seen to emerge in succession. When the occipito-bregmatic circumference is expelled, the anterior edge of the perineum, being drawn backwards by its natural elasticity, slides over the face, which affords it a plane inclined obliquely from the forehead to the chin, and approaching near the coccyx goes afterwards to place itself on the fore part of the neck, forcing meanwhile the head to turn over upon the mons veneris.

4th. *Restitution*.—The head, now freed from all constraint, and incapable of retaining the twist which had brought it under the arch of the pubis, soon recovers its natural relation to the shoulders and rest of the body, which had been temporarily changed; that is to say, its antero-posterior diameter again crosses the transverse diameter of the shoulders at right angles, as it did when at the superior strait. In one word, the occiput turns towards the left groin, while the

chin is directed towards the opposite sub-ischiatic space, and the title of act of restitution has been given to this rotation.

After a calm of a few seconds or minutes' duration, the shoulders descend into the excavation, and perform a pivot motion upon the anterior right and posterior left inclined planes; the right shoulder being directed behind the symphysis or under the pubic arch, and the left on the front of the sacrum, forces the head to undergo a similar motion, which places it entirely crosswise, the occiput being to the left and the face to the right. In this direction they engage in the inferior strait. The right appears first under the pubis; the child's body bends on its right side, so as to accommodate itself to the pelvis; the left shoulder comes down upon the perineum; the vertical axis of the thorax is parallel with the axis of the perineal strait; the vertical axis of the abdomen represents that of the superior strait; they pass the vulva together; and the rest of the body, rendered very slippery by the liquor amnii and sebaceous matter, and now representing only the point of a cone, whose base has already escaped, is expelled by the power of the same effort, and the labor is terminated. M. Nægele, or rather Flamant and Stoltz, maintain that usually the shoulders, in the same manner as the head, pass through the passage a little obliquely, the one being in front and to the right, the other behind and to the left; but it appears to me that these observers have here taken the exception for the rule, and that the progress of the labor is such as I have established. In fine, I consider the question as settled.

B. *Second Variety. Right Occipito-Acetabular Position.*—Second position of Solayrès and Baudelocque; right antero-lateral of Madame Boivin; right occipito-anterior, Dugès; 3682 in 20,517 cases (Madame Boivin); 4659 in 22,282 cases (Madame Lachapelle); 23 in 81 (Clinic at Strasburg); 13 in 47 (Pacoud).

This position, which Baudelocque and almost all the French authors regard as the most common after the first, which Siebold attempted to show to be the most frequent of all, is, on the contrary, according to M. Nægele, one of the most rare. In twelve hundred labors, this author did not meet with it once. M. Stoltz, who participates in this opinion of the professor of Heidelberg on this point, admits, however, that he witnessed three cases in seventy-eight labors (at the Clinic of Strasburg). M. Nægele says that, if the opposite opinion prevails with us, it is because, towards the middle of labor, the left fronto-acetabular position is already transformed into the right occipito-acetabular, and that the touch, then, in fact, indicates an antero-lateral position, while at the commencement it was in reality a postero-lateral one. Where a statement was so contrary to the generally received opinions, it could not fail to meet with opposition; so, in its appearance in France, it was warmly opposed by M. Ménard, and it has not been adopted by Gardien nor by Désormeaux; M. Stoltz is the only one among us who declares himself its defender. It is a difficult question to decide. Nægele and Stoltz, who speak from observation, try to show that an entire confidence cannot be placed in the proportions at the *Maternité* of Paris. To ascertain the position at the commencement of labor is so very difficult, that the pupils, however well instructed we may suppose them, may fall into frequent error. But is M. Nægele sure that he has never himself been mistaken at this stage of the labor, and that he may not have taken sometimes one position for the other.

Nevertheless, the assertions of so distinguished an author are of too much weight in my eyes for me not to give them at once great attention; I have, therefore, embraced every possible opportunity of putting them to the test. Without exactly coinciding with him, the results which I have obtained approach his in some respects. Before the rupture of the membranes, the occiput appears to me to look more frequently towards the acetabulum than towards the sacro-iliac symphysis. I have thought that I remarked, on the contrary, that, in traversing the passage, it turns more frequently to the side or behind when it reaches the excavation,

than in the first position. Indeed, I have found that even in the excavation it is more frequently carried in front than M. Nægèle believes.

Admitting that the situation of the rectum might determine the occurrence of the first variety, the same cannot be said of the second. M. Dugès, it is true, mentions two cases, where, in this last-named position, the bowel was transposed, being found on the right instead of the left side; but anatomical observations in daily repeated dissections show that such an anomaly does not occur once in every three or four subjects, as ought to be the case were it the only or even the principal cause of the position: and besides, when it has been met with, was it not rather an effect than a cause?—and is it not more rational to attribute the second position to the contractions of the womb itself? If it be true, for example, as several facts carefully examined might lead me to believe, that previously to the commencement of labor, the occiput has no determinate position, and does not properly belong to one anterior variety more than to the other, may we not suppose that the uterus, being inclined to the right and in front, is more disposed to push the head towards the left than the right side of the pelvis? The impulse received by the fœtus in this inclination of the womb is necessarily directed from right to left; in which case the forehead, being arrested by the musculo-vascular edge found in the apex of the triangle represented by the abdominal strait in the living subject, must compel the occiput to yield alone to the movement, and go to place itself opposite the left ilio-pectineal eminence. Without attaching any great importance to this idea, I should find it an easy task to advance a considerable number of reasons in support of it, and I think it deserving of the attention of those practitioners who love to give an account of what they observe.

However it may be as to the causes of the right acetabular position, it is true that its mechanism differs but little from that of the preceding one; the child is impelled by the same power; the head executes the same movements, presents the same circumference in the different planes of the pelvis, and offers the same diameters to the principal diameters and axes of the straits, &c. But the occipital fontanelle is turned to the right instead of the left; the occipito-bregmatic diameter, instead of proceeding from left to right, goes from right to left, and takes the place of the bi-parietal diameter; during the act of rotation, its extremities slide upon the right anterior, and left posterior inclined planes, to conduct the occiput under the arch of the pubis, and the forehead in front of the sacrum.

At the inferior strait and vulva there is not the least difference remaining betwixt the two positions; but after the escape of the head, the occiput in its act of restitution turns to the right instead of inclining itself towards the left; the left shoulder, and not the right, comes under the symphysis pubis; the right side, and not the left, slides along the sacro-perineal curve; the face and whole anterior surface of the fœtus look towards the inside of the woman's left thigh, instead of turning towards the right; but nothing of all this process changes the proportional relations of the fœtal head to the maternal pelvis. At the superior strait, the left parietal bone descends first behind the right side of the pubis. The right parietal bone is turned backwards to the left and above. The sagittal suture is a little elevated in the same way. The occipito-bregmatic circumference is inclined forwards, downwards, and to the left, crossing obliquely the plane of the strait as the circle of a sphere. The anterior extremity of the bi-parietal diameter is supported against the left side of the pubis, while its posterior extremity descends by a see-saw motion from behind forwards, and from right to left, affecting partially rotation. At the inferior strait, it is the left side of the vertex which becomes fixed under the left ischio-pubic ramus, until the right parietal protuberance has fully advanced into the ischio-pubic arch, and has completed the rotation of the head. The head thus escapes from the bony strait, whether directly in the direction of the coccy-pubic diameter, or in a direction slightly oblique.

The shoulders follow the left diagonal line of the superior strait, and, in de-

ascending, the left is turned a little in front, and the right somewhat towards the hollow of the sacrum. The left side of the child is curved on itself, and becomes very concave. At the inferior strait we see the anterior shoulder enter the top of the pubic arch from left to right, and the posterior shoulder advances by degrees from right to left on the anterior edge of the perineum.

This variety is considered as less favorable than the other; some have said that it renders the labor slower and more fatiguing. When the forehead is turned towards the right sacro-iliac symphysis, it is separated from the parietes of the pelvis only by fat and a layer of peritoneum, on which it slides without any difficulty; while in the second position, the rectum shortens the opposite oblique diameter a little. When in the first position, the occiput and forehead rest on two regular planes equally solid and smooth; while in the second, the anterior part of the head depresses the rectum from above downwards, pushes it along before it, and folds it so as soon to form a kind of cushion, whose thickness is also increased by the fecal matters contained within it. It at least follows that the left posterior surface of the basin is too soft to allow the head to glide rapidly down into the lower part of the excavation. The fœtus might here, to a certain extent, be compared to a solid straight stick, one end of which is applied upon a smooth hard plane, as, for example, a plate of glass, or on the other hand upon an uneven or spongy surface, such as a woollen cloth or a mattress. In the former case, the stick would slide along without the least obstacle and under the slightest impulse, while in the latter it would not slide at all, or with difficulty. Further, it may be conceived that this state of the plane, on which the forehead is obliged to descend, may in the same way interfere with the act of rotation or the pivot motion, &c. All this may doubtless be true, but, upon looking at the subject a little closer, we soon perceive that much is to be retracted of these pretended difficulties; for the thickness of the rectum, when compressed by the head, is reduced to a very small degree; the matters with which it is filled are or may be evacuated at the very beginning of labor; and the forehead in every case presses on the rectum, through the parietes of the womb, which does not rise in folds. Observation proves, moreover, that there is not the least difference as to difficulty between the first and second positions.

On this subject I think I ought to point out a contradiction found in the authors on midwifery. On the one hand, they say that the right acetabular position is determined by the presence of the rectum on the right side of the sacrum; and, on the other, that this same position is rendered less favorable by the friction of the head on the bowel on the left.

Remarks on the first two positions.—The act of rotation in these two positions has not been interpreted in the same way by all authors. Madame Boivin and some others account for it by referring it to the contraction of the muscles that line the excavation. But it is evident that such an explanation is inadmissible; for, 1. This rotation sometimes takes place when the head is still above, and most generally does not occur until it is below the muscular bundles, to whose contractions it is attributed; 2. If the pyriform and internal obturator muscles, by their contractions, could make the head revolve on its own axis, they would carry it across the pelvis, and not from front to rear. By referring it to the action of the sterno-mastoid muscles of the fœtus itself, an opinion has been advanced still less worthy of being combated than the preceding one.

Besides, what need is there for us to look for the cause of this movement, either to the muscles of the pelvis, or to the child's neck? The occiput turns towards the pubis, because it finds a vacant space there, while it is strongly resisted on the sides; it deviates from its original direction for the same reason that the forehead turns, at the superior strait, towards the sacro-vertebral angle. The form of the pelvis and the laws of mechanics give a perfectly clear account of this peculiarity: the anterior wall of the excavation, which is much shorter than the

posterior, being deeply notched and somewhat hollowed out, any salient part of the head, when strongly urged by the contractions of the womb, could scarcely fail to engage in it, not only without the assistance of the contractions of the inclined planes, but even in spite of those contractions, were they really to take place.

C. Third Variety. Occipito-Pubic Position.—The third of Solayrès, Baudelocque, &c. : 6 in 20,517 (Madame Boivin).

The ancients regarded the occipito-pubic as the most frequent position, because they did not distinguish the two antero-lateral ones, and only judged from what is observed at the inferior strait. Baudelocque admitted it rather for the purpose of filling up his plan than from the testimony of his senses. Since his time, Gardien, Dubois, Flamant, Dewees, and Désormeaux, as well as Madame Boivin, have continued to describe it, at the same time admitting it to be very rare. In fact, out of twenty thousand five hundred and seventeen children, six only were found to present in this manner. MM. Maygrier, Capuron, and Dugès have argued against the possibility of its occurrence, and Madame Lachapelle affirms that she never observed one single instance of it in more than thirty-six thousand labors.

The question, therefore, is, whether it is proper to retain it in a regular classification. The labors and researches of the moderns are almost the only ones that can be usefully consulted for the purpose of deciding upon this point; for, as Baudelocque found no objections that he thought it worth while to combat, he neglected to cite any particular facts for the purpose of demonstrating the possibility of its occurrence. It is objected, by MM. Maygrier and Capuron, that the forehead, being a solid and round part, cannot maintain itself in front of the sacro-vertebral angle during the expulsive contractions of the womb; that two round and equally salient bodies cannot slide upon each other without turning off to the right or left; in one word, that, previously to the close of pregnancy, or at least at the very commencement of labor, the forehead of the foetus is necessarily repelled by the promontory towards one of the sacro-iliac symphyses.

Without denying the force of these objections, I may, notwithstanding, be permitted to observe that, in the recent pelvis, the sacro-iliac hollow is to a great degree effaced by the psoas muscles and iliac vessels; that the vertebral projection is thus considerably diminished; that the entrance to the excavation is then not so large behind as it is in front; that the womb being directed in conformity with the axis of the superior strait, rather than with the axis of the spine, and the head of the child habitually bent upon its breast, the forehead, at the commencement of labor, ought to correspond to the anterior surface of the first piece of the sacrum, and not to the sacro-lumbar projection, properly so called; and, therefore, that it does not seem impossible for the head to descend in a direct position. I add, with M. Désormeaux, that authors have reasoned upon this case as if the pelvis were always the same, always regular. Where the vertebral angle is but slightly expressed, or thrown back, the sacro-pubic diameter is sometimes longer than common, without the cavity of the pelvis being really vitiated; in such a case, the third position, far from being impossible, should, on the contrary, be the most natural and the easiest, inasmuch as the head, in engaging, always strives to place the great diameter of the circumference that presents parallel to the greatest diameter of the pelvis. Although Madame Boivin states, on the one hand, that she has met with it six times in twenty-five thousand five hundred and seventeen cases, on the other, Madame Lachapelle affirms that it is never met with. These contradictory assertions at least prove that the situation of the head at the commencement of labor has not always been recognized with certainty at the *Paris Maternité*. And how could it be otherwise? By the confession of all practitioners, it is very often impossible, previously to the rupture of the membranes, to tell whether the occipital fontanelle is in front or behind, and,

à fortiori, whether it is to the right or left, rather than in the middle of the strait. Now, is it probable that Meadames Boivin and Lachapelle could, themselves, have touched each of these thirty-six thousand women before the head had engaged in the excavation? To conclude, although it be true that the occipito-pubic position, three very authentic cases of which are mentioned by Dr. Dewees, is of very rare occurrence, it is not less true that we are not, in the present state of science, authorized to deny its possibility. Mr. Radford has again recently established positively its existence. The posterior fontanelle was behind the symphysis pubis, and the anterior in front of the promontory of the sacrum. There was prolapsion of the cord, and the labor progressed with extreme slowness; and as its mechanism is not altogether the same as that of the occipito-acetabular positions, I think it right to say a few words in regard to it.

When at the superior strait, the occipito-mental diameter and the occipito-bregmatic circumference are placed as in the two first positions, and always correspond to the axis and plane of that opening; but the bi-parietal diameter is situated transversely, and the occipito-bregmatic from front to rear, instead of being parallel to the oblique diameters; the pivot movement is not necessary, and does not take place; the direction of the various axes of the head is the same at the end as at the commencement of the labor. As the shoulders look towards the iliac fossæ at the commencement, it is uncertain which way the act of restitution will take place; in fact, there will be none, because there was no previous act of rotation; however, as it is a rare occurrence for the shoulders not to place themselves one in front, and the other behind, before they pass through the inferior strait, the occiput, after a few moments of indecision, turns to the right or left, but without our being able to know beforehand which; after that, there is nothing peculiar in the rest of the labor. I will state, moreover, that the mechanism of this position has been rather established *à priori*, than deduced from direct observation, and that the parietal inclination mentioned in the two first may also take place in this.

Remarks on the occipito-anterior positions.—It cannot be denied that these three positions are in fact but shades of each other. In all three cases, the head begins by flexing itself strongly down upon the breast, and ends by extending itself as it passes out under the arch of the pubis; the occiput, a projecting part that always comes out first, never has more than two inches, or at most two inches and a half, to pass over before it reaches the arch of the pubis; and in escaping from the pelvis, it slides on a surface that is plane and even convex, but not at all concave. Although, in the first variety, everything is disposed in the most advantageous manner, the presence on the one hand of the rectum, and on the other of the bladder, and sacro-vertebral angle, cannot, after all, render the second and third any more difficult or dangerous.

2. *Occipito-Posterior Positions.*—320 in 35,895 cases (Madame Lachapelle); 203 in 20,517 (Madame Boivin); 30 in 2410 (Trochon); 3 in 149 (Merriman).

Of far less frequent occurrence than the occipito-anterior positions, the occipito-sacral positions are also much less easy, and less natural. If Albert gives them as the most frequent, it must have been only from inadvertence. In order to emerge first, the occiput is compelled to traverse the whole extent of the anterior face of the sacrum, the coccyx, and perineum, that is to say, a surface of from seven to eight inches in length; while in the other positions it escapes after passing over not more than two inches. The posterior wall of the pelvis is deeply excavated, while its anterior half circle is rather convex than concave; the summit of the head falls nearly at right angles upon each point of that wall, and the occiput meets a new resistance at every effort, which is not the case when it is turned in front. The vertex cannot present itself at the vulva until a considerable part of the breast has descended into the excavation; so that it is no longer merely the occipito-bregmatic diameter, but it is a line drawn from the anterior fontanelle

to the posterior part of the thorax, that is referred to the antero-posterior diameter of the lower part of the excavation. Here, the vertebral column is so strongly curved that it cannot but lose a considerable part of the force impressed upon it by the womb, before that power can reach the head. The head and trunk both together, and not the head alone, traverse the excavation and inferior strait; and finally, the forehead is commonly too broad to fill up the top of the pubic arch accurately, and the coccy-public diameter may, on this account, lose as much as half an inch of its length.

M. Capuron even maintains that delivery is not then possible, and that the occipito-posterior portions constantly require the use of the forceps, unless the fetus be very small or the pelvis very large. Baudelooque holds almost the same language, and this was also the opinion of the ancients and Levret. Blundell and some others have equally professed it in our day. I cannot, however, adopt such a doctrine. De la Tourette, relying upon facts, strongly opposes it. I have seen the head seven times escape from the vulva in this way. There was nothing remarkable either in the size of the child, or in the dimensions of the pelvis, in five of these women. The other two were delivered before term, one at six months, and the other at seven months and a half. Mauriceau, who observed it several times, De la Motte, Smellie, and Denman, also report cases of it. We see that Trocon relates 30 in 2410 labors; M. Merrem cites three in 149. M. Dugès even speaks of a fetus expelled in this manner, although it weighed eight pounds. Moreover, since M. Capuron readily draws down the head with the forceps, without bringing the occiput in front, we do not see why it would be impossible for the efforts of the organism to do the same. M. Capuron is evidently mistaken in the mechanism of labor in this position. M. Nægele proves, in fact, that it is not directly antero-posteriorly, but towards the side or obliquely, that the vertex reaches the inferior strait. I will add that, by depressing forcibly the coccyx or one of the sacro-sciatic ligaments, the vertex often allows the frontal protuberances to disengage themselves first, and the delivery to take place as if the face presented originally. Although the position is quite rare, more rare, indeed, than the calculations of Madame Lachapelle would warrant, still it would not be proper to maintain, with M. Omoboni and M. Bazignan, who, in relation to this matter, adopt the opinion of M. Capuron, that it is impossible, and that it should never be left to the resources of nature. The face in front renders the labor very difficult, says Ræderer, but it does not arrest its progress unless it is complicated.

Hamilton, who insists also that this is one of the most difficult of labors, says, however, that it must be left to nature, and that instruments are more hurtful than useful. Wigand considers it very rare, for he met with it only six or seven times in his immense practice. Puzos, who speaks of it as difficult, and who, with Capuron, advises the use of the forceps, agrees, however, that the difference is so slight that it is scarcely perceived.

The study of its varieties will enable us to judge, moreover, in what proportion this position may be held as a distinct variety; and it would be besides absurd at the present time to reiterate, with Courtin, Gelée, and Guillemeau, that it is dangerous, because the liquor amnii or the discharges may enter the mouth of the fetus and suffocate it during labor. Finally, it is more difficult than the other, as Deventer has already observed; but it is not attended with so much trouble as to justify the efforts recommended by Clarke and Blundell for its transformation.

The causes that occasion the posterior position to occur are little understood; it is better frankly to avow our ignorance than vaguely to refer them to this or that shape of the pelvis, to the direction, or disproportioned dimensions of the womb, to certain habits of the woman, to uncommon movements of the fetus, &c. The only thing that can be affirmed about them is that it is pretty com-

mon to meet with them several times in succession in the same woman. Besides, this is a question that requires some careful researches before it can be decided. Although the three principal varieties of this position differ only by slight shades from each other, I nevertheless think, but merely for the purpose of not deviating too far from generally adopted opinions, that I am bound to give a succinct explanation of its peculiar mechanism.

A. First Variety. Left Fronto-Acetabular Position.—Fourth position of Baudelocque, Gardien, Dubois, Désormeaux, Lebreton, Flamant, Madame Boivin; third of Maygrier, Capuron, Dugès, and Madame Lachapelle. 189 in 20,517 cases (Madame Boivin); 164 in 22,248 (Madame Lachapelle); 30 in 100 (Nægèle).

The left fronto-acetabular position is the most common of the three posterior varieties. Solayrès, MM. Nægèle and Stoltz, contend even that in frequency it comes immediately after the first, and that it is the starting-point of the greater part of the second. Having discussed this doctrine when treating of the right occipito-acetabular position, I will not return to it now. It unites all the most favorable conditions of its species, and in this respect it excels all the others. The back of the fœtus being turned backwards and to the right, the abdomen towards the front and left, its left side to the front and right, and its right side behind and towards the left side of the womb, the head engages in the superior strait in such a way that the occipito-mental, bi-parietal, and occipito-bregmatic diameters, and occipito-bregmatic circumference, are parallel with the oblique diameters, the plane and axis of that strait, respectively, as in the first anterior position. There is this difference, however, that the frontal extremity of the occipito-bregmatic axis occupies the place of the sub-occipital extremity; that the left extremity of the bi-parietal diameter has assumed that of its right extremity; that the anterior fontanelle glides behind the ilio-pectineal eminence, instead of descending before the sacro-iliac symphysis; and that the posterior fontanelle, instead of being slightly inclined in front and towards the left, is, on the contrary, turned more or less backwards and towards the right, which, as is evident, does not at all interfere with the proportional relations of the head and pelvis, and proves that, so far, the posterior are not more unfavorable than the anterior positions.

After the dilatation of the neck and the rupture of the membranes, when the occipito-bregmatic circumference has passed the superior strait, the head meeting with a deep excavation, behind, is rapidly urged to the very bottom of the excavation, and at first the labor seems to progress more rapidly than in the very opposite position; but, from this moment, the difficulties mentioned above become more and more manifest. Instead of being gradually replaced by the act of extension, as in the anterior positions, the flexion still continues to increase with every pain; whilst the forehead is arrested behind the pubis, and the occiput is abutted against the front of the sacrum, the coccyx, and perineum, which resist so as to force it to move forwards, the breast engages in the excavation, slides in some measure behind the face, opposes the turning of the chin towards the centre of the pelvis, and makes it very difficult for the occipito-mental axis to become parallel with the central line of the inferior strait, and especially with the axis of the vulva. The vertebral column, being too much curved, loses a part of the power impressed upon it by the womb; as it presses upon the head at an angle which becomes more and more acute, it cannot urge it onwards with the same degree of energy, even although the same degree of force might be employed.

The pivot movement takes place, nevertheless, and the forehead, or the *bregma*, sliding along the left anterior inclined plane, comes from left to right, and from behind forwards, to place itself under the arch of the pubis, whilst the vertex, or occiput, moving upon the right posterior inclined plane, proceeds from before backwards and from right to left, into the hollow of the sacrum; but this rotation is effected with some difficulty, because the forehead is too wide to adapt itself accurately to the sub-pubal notch; because, beneath the superior strait, the lateral

regions of the posterior half of the pelvis are made up of soft parts, which do not repel the head with sufficient force towards the median line; lastly, because the extremities of the occipito-frontal diameter and its circumference, and not those of the occipito-bregmatic, roll in inverse directions upon the planes of the excavation, as is the case in the occipito-anterior position.

Notwithstanding so many unfavorable circumstances, the occiput descends, by bearing strongly upon the sacrum, the coccyx, and perineum, and the foetus finally passes the strait. In this situation it is upon the posterior commissure of the vulva, and not upon the inferior edge of the symphysis pubis, that the occipito-bregmatic diameter now presses, slides, and reverses itself from above downwards and from before backwards; so that the posterior fontanelle, the sagittal suture, the anterior fontanelle, the parietal protuberances, the frontal protuberances, and the several parts of the face, are seen to appear in succession in front of the perineum. As soon as the chin is disengaged from the summit of the pubic arch, the act of restitution takes place; the face inclines towards the left groin, and the occiput towards the right sub-ischiatric notch; the left shoulder proceeds in front, under the symphysis; the right shoulder reaches the concave surface of the sacrum; the head, governed by the movement of the trunk, places itself crosswise; and the rest of the labor is concluded as it is in the right occipito-acetabular position.

B. Second Variety. Right Fronto-Acetabular Position.—Fifth position of Baudelocque, Gardien, Dubois, Désormeaux, Madame Boivin, &c.; fourth of Maygrier, Capuron, Dugès, Madame Lachapelle, &c.: 92 in 20,517 cases (Madame Boivin); 66 in 21,248 cases (Madame Lachapelle).

The right fronto-acetabular position, although rather more rare than the preceding one, is notwithstanding more common, relatively to the opposite fronto-acetabular position, than the right occipito-acetabular is when compared to the left occipito-acetabular position. If the contrary has been admitted, it is because it has been often confounded with the first, to which it frequently serves as the starting-point.

In this position the back of the foetus is directed to the left and backwards, the right shoulder to the left and forwards. The bi-parietal diameter represents the left antero-oblique diameter. The occipito-bregmatic is parallel with the right antero-oblique. And the lesser circumference and occipito-mental diameter are parallel with the plane and axis of the strait. The head, when engaged in the excavation, revolves a half-quarter of a circle upon its vertical axis. The occiput, sliding upon the left posterior inclined plane, proceeds to lodge in the hollow of the sacrum; while the bregma, rolling upon the right anterior inclined plane, is directed to the symphysis pubis.

Upon emerging from the vulva, when the act of restitution takes place, the occiput gradually turns towards the inside of the left thigh, and not the right, as in the fourth position. As to the rest of the labor, it is terminated like the former, except that the front of the foetus at last looks towards the right, and its right side directly in front, whereas in the other variety, directly the reverse is observed. Moreover, it is said to be rather more difficult, in consequence of the presence of the rectum, which must retard the progress of the occiput.

Remarks on the mutations of the occipito-posterior positions.—M. Nægèle maintains that the fourth position of the vertex is much more common than the second, and that the French accoucheurs did not perceive it, because, being led away by the authority of Baudelocque, they did not perceive that the former of these two positions commonly converts itself into the right occipito-acetabular position, as soon as the head gets through the superior strait.* These assertions of the German professor ought to be taken into consideration. Smellie has already mentioned the conversion of a left fronto-acetabular position into the second of

* My own experience in midwifery is in perfect accordance with M. Nægèle's assertion on this point.—M.

Baudelocque. It appears certain that, when the occiput reaches the bottom of the excavation, it does, in fact, in some instances, turn towards the acetabulum instead of proceeding towards the posterior median line. I have already observed and pointed out to many students the reality of this phenomenon, so as to leave no doubt upon the subject. Upon passing the pelvic circle, the head by degrees inclines to one side, and places itself exactly crosswise, soon after it descends into the excavation. This pivot motion continues, under the influence of the uterine contractions; if it be the fourth position, the posterior fontanelle gradually reaches the arch of the pubis, by gliding from behind forwards, and from right to left, along the right anterior inclined plane, and on the other hand from left to right for the fifth.

M. Stoltz has remarked, and I have also remarked, that the sanguine *bosse* occupies at this time the same place as in the first or the second position; that is to say, it covers more particularly the right parietal in the fourth, and the left parietal in the fifth. We understand, in fact, that, as regards the left half of the superior strait, the inclination of the head will be the same at first whether the occiput looks towards the sacro-iliac symphysis, or is placed behind the cotyloid cavity, and that the right parietal descends first in these two cases every time the fifth position terminates in the first. The same thing necessarily takes place with respect to the left parietal in the right occipito-iliac position.

Ordinarily, the conversions in question do not take place at the inferior part of the excavation until after some considerable duration of labor. Solayrès, who has already pointed them out, says that they are not uncommon. Baudelocque appears, also, to have observed them, but no one has ascribed the same importance to them as M. Nægèle. For my own part, I am satisfied that, in place of forming the exception as is generally thought, and as I have thought myself, they constitute really the rule.

I am ignorant of the causes to which such anomalies ought to be attributed; I have never found anything peculiar in the conformation of those women who have exhibited them; the labors have progressed regularly, and there was nothing unusual in the weight of the children; I think I have only noticed that, from the very beginning of the labor, the antero-posterior diameter of the head was much nearer to the bis-iliac than to the sacro-pubic line of the strait, and that the pubis, being slightly depressed above, seemed to favor the anterior rotation, by the hollowiness of the arch, and by the distance to which the acetabula were separated.*

The knowledge of these conversions ought not to be overlooked in practice: in the first place, because, as they are favorable, we may in some instances be enabled to promote, and even to enforce them whenever such a thing is possible. Clarke, considering the fourth position as very troublesome, endeavored, the moment he ascertained it, to push the forehead to the left, and then backwards by means of the finger, and says he succeeded thirteen or fourteen times by adopting this course. Blundell tried this plan before resorting to version, and Mr. Burns, who understood the views of M. Nægèle, affirms that he was never less fortunate than the celebrated accoucheur of Dublin. He even maintains that success is easy and prompt, and that he succeeded, although the occiput had already passed into the curve of the sacrum, and when the nose was on a level with the pubal arch. It is possible, however, that the resources of art only correspond in these cases with the natural tendency of the organism, and that without them many conversions that are attributed to them would have occurred spontaneously.

* I have in a good many instances observed the foetal head to change its position during labor, so as to bring the occipital fontanelle from the left acetabulum quite over to the right one, and then go back again to the original position. In an ample pelvis the child has power to change the position of its head very readily, until it is fairly within the vagina, where it is held too firmly to admit of such spontaneous rotations.—M.

Besides, Clarke was wrong in considering himself as the originator of this manipulation; Smellie practiced it before him, and prided himself no little on its efficacy.

In the next place, such mutations afford a very natural explanation of the mistakes which we have been heretofore compelled to attribute to the ignorance of those who committed them. For example, it pretty often happens that two accoucheurs, called to the same woman, one at the commencement of the labor, and the other at its close, announce, each, a different position; that one announces an occipito-anterior, and the other the contrary position; and that, upon seeing the head emerge, one of them remains convinced that he had been really deceived. Notwithstanding, both of them may have been right, for the fourth or fifth position might really have existed, although the labor terminated in the second or first. Now and then we observe still more remarkable conversions. M. Stoltz cites a case in which a fifth position was converted first into the fourth, then into the second, at the moment the cranium escaped from the inferior bony strait, then into the fifth again for the passage of the shoulders, and, finally, into the first at the expulsion of the rest of the body. I saw once the occiput, which had engaged in the fourth position as far as the point of the coccyx, rise from the right to the left under the symphysis, in traversing the vulva, and take its original direction for the escape of the shoulders.

It would be wrong, however, to generalize this remark too far, and apply it to all cases where the escape of the fœtus contradicts the diagnosis established by the practitioners from whom the woman first receives attention: it would be too convenient a resource for the concealment of real mistakes, and one of which the incompetent and ill taught would not fail to avail themselves at the expense of truth.

C. *Third Variety. Fronto-Pubic Position.*—Sixth position of Baudelocque, MM. Gardien, Dubois, Désormeaux, and Madame Boivin; occipito-sacral of MM. Flamant and Lebreton; rejected by MM. Maygrier, Capuron, Madame Lachapelle, and M. Dugès.

All the arguments advanced by authors against the possibility of Baudelocque's third position apply equally well to the sixth. If the forehead cannot maintain itself upon the sacro-vertebral angle, it is, *à fortiori*, impossible for the occiput, which is much narrower, to maintain itself in that situation, and not to deviate either to the right or left. But, as the impossibility of the occurrence of the occipito-pubic position is far from being a matter of demonstration, so also is the same thing to be admitted as regards the opposite position. Sometimes the sacro-vertebral angle, in the living subject, projects but very slightly, a fact to which sufficient attention has not been paid, and it is evidently wrong to reason as if the head were not already flexed upon the breast from the very beginning of labor, and as if it were the occipito-frontal, and not the occipito-bregmatic diameter, that is at the very commencement parallel to the antero-posterior diameter of the strait.

If it be true, as we learn by the *touch* at our amphitheatres, that, in many women, we can readily feel the most prominent part of the fœtal head over the centre of the pelvis, quite above its abdominal opening, long before the commencement of labor, I cannot perceive how the sacro-vertebral angle can constitute an insurmountable obstacle to the sixth position. It must, therefore, be admitted, at least, as a possible shade, if not as a real variety.

Its mechanism, moreover, scarcely differs from that of the two oblique varieties. The posterior surface and occiput of the fœtus being, from the beginning, turned directly backwards, there is no occasion for the head to perform its pivot movement in the excavation, so as to engage in the inferior strait. The shoulders pass through the superior strait parallel to the bis-iliac diameter, and there is no act of restitution without, any more than there is an act of rotation within the pelvis; and if the face comes at last to turn towards one of the thighs, and the occiput

towards the other, it happens so because the trunk, in revolving on its vertical axis to place the shoulders in an antero-posterior attitude, necessarily carries the bi-parietal diameter in the same direction.

It is less favorable than the corresponding oblique positions, only because it renders the forehead and face more liable to be turned downwards, and to permit the great diameters of the head to become parallel to the smallest ones of the pelvis. When they attributed the difficulties accompanying it to the friction of the face behind the pubis, accoucheurs of past ages, doubtless, had not reflected on the state of flexion in which the head is found to be placed; for it would have been easy for them to see that it is the anterior extremity of the occipito-bregmatic diameter, and not that of the occipito-frontal diameter, that must rest upon the hinder part of the pubic articulation.

General remarks on the positions of the vertex.—Besides these six varieties, there would be a great many intermediate ones, provided the occiput were obliged, in each of them, to correspond to some indicated point of the pelvic circle. But it is quite enough to make a particular position of all the cases where the occiput looks towards any portion of the left anterior quarter-circle of the pelvis, another for the right, and a third and fourth for the posterior half of the pelvis.

When Madame Lachapelle says that the occipito-iliac are more frequently to be met with than the fronto-acetabular positions, she must surely be misled by some preconceived idea. Further, as the author herself admits that the head remains but a short time thus directed towards the iliac fossae, it is manifest that the transverse positions are completely converted into the corresponding oblique ones, and that they do not deserve a particular description.

Anomalies.—In some positions of the vertex, the movements of the head seem to deviate wholly from the ordinary march of a labor. For example, it may happen, and indeed it does happen pretty often, that, after having passed obliquely through the superior strait, it places itself transversely in the excavation, where it remains for a longer or shorter time previously to performing its pivot motion. In other cases, this motion is not performed at all, or but imperfectly. The head, therefore, passes the inferior as it did the superior strait diagonally, or even emerges from it in a transverse position, so as to bring the occipito-bregmatic into parallelism with the bis-ischiatric diameter. In some other instances, the occiput, upon escaping from the vulva, turns in a direction directly contrary to that it ought to pursue, provided the restitution were regular. It was in this way that Solayrès and Baudelocque saw, and that I myself have seen, the face, in a left occipito-acetabular position, turn toward the woman's left thigh, as it ought to do in the second position, and *vice versa*; so that, from the commencement to the close of labor, the fœtus performs about half a spiral turn, from behind forwards, and from left to right, or from right to left, according to the position.

Baudelocque was mistaken when he attributed this irregularity, on the one hand, to the smallness of the foetal head, or on the other to the excessive amplitude of the pelvis; I have had occasion to notice it in women whose labors were very slow, and whose pelves were not larger than necessary for the transmission of the child. Might it not depend upon some peculiarity in the form of the inferior strait or excavation, some anomaly in the uterine contractions, or rather of the impulsion originally communicated to the fœtus; and which, after having first produced the common act of rotation, might be strong enough to compel the head and shoulders to revolve so as to perform a complete semicircular turn? In the present state of tokological science, it is impossible to answer this question. Perhaps it ought to be attributed, as M. Champion thinks, to the inverse position of the shoulders in the pelvis.

§ 2. PRESENTATION OF THE FACE.

4 in 1800 cases (Merriman); 5 in 1899 (Bland); 74 in 20,517 (Madame Boivin); 103 in 22,243 (Madame Lachapelle); 58 in 6555 (Boer); 1 in 200, (Nægele, § 252); 4 in 182 (Clinic of Strasburg); 1 in 157 (Merriman); 1 in 268 (Kluge); 122 in 17,000 (Kilian); 2 in 273 (Pacoud); 30 in 10,742 (P. Dubois); 2 in 275 (Ramoux); 18 times in a practice of 20 years (Chevreul).

Until lately, it was thought improper to trust the delivery to the natural resources of the mother, when the face of the child presented, and that every attempt should be made to reduce this presentation. Viardel recommends the fingers, supporting a compress with a ribbon attached to it, for the purpose of pushing back the forehead. Madame Stone states that a midwife had used such efforts in cases of the kind, that the fœtus had its face all lacerated, and that one of its eyes hung on its face. A case, almost similar, is related by Perfect. Mauriceau says, however, that the child may thus escape, and remarks that it presents a livid appearance. Portal looked more closely into this subject, for he says, "All that can happen to the infant is to have the face black and swollen, and that there is no more difficulty in this than in natural labor;" but, as he wrote in the preceding page that "it is one of the most preternatural of deliveries," his remark carries with it no weight. De la Motte, who observed the same thing, seems to have been surprised that one of three deliveries, in spite of him, terminated of itself. In another case, when the neck, the face, and the chin presented, the fœtus exhibited a horrible appearance. Deventer, considering them possible without assistance, does not the less endeavor to prevent them. Fichet de Flechy, who reports a case of it, is of the same opinion. I might almost say the same of Smellie, who recommends that they should be terminated, either by version, the forceps, or even the crotchet. Rœderer and Petit agree, also, that some may terminate without assistance; inasmuch as Baudelocque and Stein have thought that their spontaneous termination is only possible in those cases where the fœtus is very small or the pelvis very large, Gardien, Maygrier, &c., have continued to rank them among preternatural labors.

Such was the state of the subject when, in 1821, Madame Lachapelle laid it down as a principle that this sort of labor is nearly as easy and as natural as that by the vertex, and affirmed that, out of seventy-two cases of this kind, forty-two were concluded without danger either to the mother or child. M. Désormeaux ranged himself on the side of the midwife-in-chief of the *Maternité*; and the same ideas are found in the work of Boer, who, after saying that delivery by the face is very simple and very natural, describes its mechanism with the greatest care. This author, whose work is dated much earlier than that of Madame Lachapelle, was anticipated by S. Zeller, who, about 1789, professed precisely the same doctrine, and who cites forty-three presentations of the face, terminating without assistance, out of 3155 cases. In fine, I do not hesitate to claim it for Deleurye, provided it does not belong to P. Portal. "These authors admit the presentation of the face as very bad," says Deleurye. "I do not think so when it presents directly, because we see such deliveries terminating naturally every day. They are in truth somewhat long, but they finally terminate without the assistance of art." Denman, in his turn, is of opinion that, in the positions of the face, the child can be born without inconvenience, but that sometimes the face is swelled in a most astonishing manner. Nannoni advanced the same opinion before Boer; and A. Leroy affirms that the fifth child of Mary de Medicis, the Duke d'Anjou, was born in this way.

M. Chevreul expresses himself in nearly the same manner: "I can enumerate eighteen labors," says he, "that occurred since 1792, either in my private practice, or at the *Maternité* at Angers, where the children presented the face, and which terminated naturally. All these children were of the common size; fif-

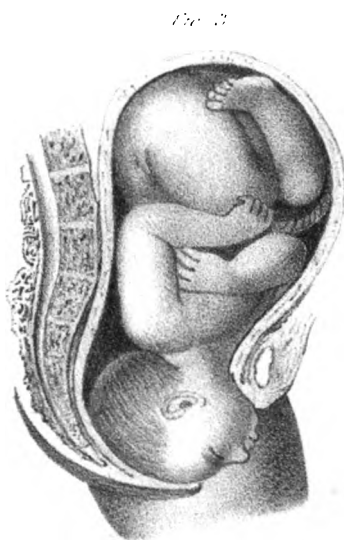
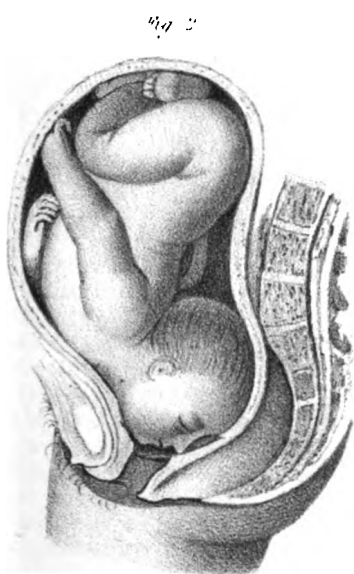
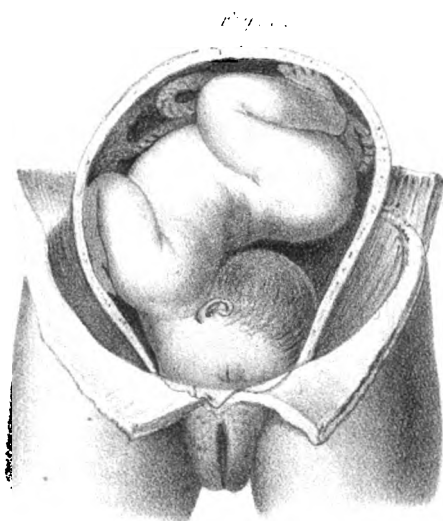
PLATE VII.

PRESENTATION OF THE FACE.

FIG. 1.—FIRST POSITION AT THE SUPERIOR STRAIT.

FIG. 2.—MENTO-PUBIC POSITION AT THE SUPERIOR STRAIT.

FIG. 3.—THE FACE AT THE INFERIOR STRAIT.



teen of them were born alive; three were dead, but appeared to have been so previously to the commencement of labor."

However, a distinguished professor, M. Capuron, has recently come out with great vigor in opposition to this doctrine, endeavoring to demonstrate, at the instance of Mesnard, upon geometrical principles, that delivery by the face, according to the mechanism pointed out by Boer, is generally impossible, provided the woman does not receive any artificial aid. But no geometry can hold good in this case. I have myself seen seven cases of face presentation. The children were born alive and well. I trusted the cases to nature, and no particular difficulties were observable. If these proofs are not sufficient, others may be added: Bang published ten cases of them in 1818. Delpech also says he saw several cases of the kind. M. Eckhardt cites one in his thesis. In his last report, M. Pacoud says he collected more than 100 cases at the Clinic of Bourg; and M. Kilian gives 122 for the hospital of Prague. M. Barré relates three cases in his thesis. M. Nægèle in Germany, M. Stoltz in France, MM. Bigeschi, Biagini, and Mazzoni in Italy, have likewise met with cases of them; and M. Merriman holds precisely the same language in Great Britain.

This kind of labor, therefore, is not only possible, but also for the most part quite easy. M. Capuron and many others have thought otherwise, because they did not perfectly understand its mechanism. Burton, who, under these circumstances, recommends version, and Asdrubali, who contends against the opinions of Mannoni with such bitterness, were in the same condition. M. Omoboni, who still maintains, according to the clinic of M. Bongiovani, that delivery by the face is only possible when the child is small, or the pelvis very large, must also have formed an incorrect idea of it. And, finally, it is surprising to see Flamant adopting in part the opinions of M. Capuron on this point.

This delivery, far from being impossible *a priori*, either on the dried pelvis or on it in its natural condition, is, on the contrary, very well explained even in the most disadvantageous positions. M. Chevreul, who had a perfectly correct view of its mechanism before Boer, and almost at the same time with Zeller, judiciously remarks that the chin, which soon reaches the pubic arch, allows the head to become disengaged at its point, and in this way to pass more readily the inferior strait, than if it presented by the vertex.

It is clear, when the face presents at the superior strait, with the chin towards the pubis and forehead towards the sacrum, that the fronto-mental diameter, which is only three inches, or, if prolonged to the anterior fontanelle, three inches and a half, is parallel with the sacro-pubic diameter, equal to four inches and a half, and that it occupies the situation that belongs, in vertex presentations, to one of the diameters of the occipito-bregmatic circumference. So far there is no disadvantage in a face presentation. But at a later period, when the head descends, the chin gets below the pubis before the occiput reaches the excavation, and the breast is still at the superior strait, while the face is actually engaging in the inferior pelvic circle; then the front of the neck, being stopped by the lower edge of the symphysis pubis, compels the vertebral column to react upon the posterior part of the head, which it urges from behind forwards so as to force it through the vulva, by presenting to that opening a series of circles, whose principal chords are measured by the vertical diameter of the head. The laws of mechanics, therefore, in accordance with facts, permit us to class face cases among the spontaneous labors.

Causes.—According to Deventer, the causes of this presentation are to be sought for in the obliquities of the uterus, which, from the very beginning of its action, cause the extremity of the occiput to lodge upon the margin of the strait, and thus oblige the face to descend first. According to M. Gardien, the cause lies much more in the inclination or obliquity of the fœtus itself than in that of the organ which contains it. Madame Lachapelle, who rejects both of these hypo-

theses, because she saw the face presenting at the upper strait in two women who died previously to labor, attributes it to the circumstance that the anterior obliquity of the womb being very common, the weight of the occiput must in such cases prevent the chin from remaining applied against the sternum, and must bring the mento-bregmatic diameter into parallelism with the sacro-pubic diameter from the very commencement of labor. It seems to me that all these opinions have some foundation, but that none of them suffice to explain all the facts, and that it is for the most part impossible to say why the face, and not the occiput, presents. I have, however, become convinced that these presentations are often nothing but a conversion of occipito-posterior positions of the vertex, and that it is one of the resources of the organism for expelling the head, when the occiput has to escape posteriorly.

The face positions being in fact only reversed vertex positions, it is plain that we must for both admit the same number of species and varieties. Authors, however, have generally described only four; and they have rarely agreed as to the manner of arranging them. Some make them correspond to the four oblique positions of the vertex; others, as Smellie, Stein, Bandelocque, and M.M. Gardien and Désormeaux, dispose them transversely, and from front to rear, and admit a *right mento-iliac* and a *left mento-iliac* position, as well as a *mento-pubic* and a *mento-sacral* position.

Perhaps, in studying the subject, there is some advantage in this latter mode of classifying them; but it is important in practice to know, 1. That the antero-posterior positions are rare, so much so that Madame Lachapelle has never seen a single case of that kind, although Roederer, Deleurye, Stein, &c., admitted them as very common, and as the easiest; 2. That, if they do sometimes occur at the commencement, as in one case that I saw, they soon become converted into lateral positions; 3. That the mento-sacral position, which Stein gives as the best, and of which one case is related by Smellie, is altogether impossible without this conversion; 4. That the mento-pubic position, which, being the natural termination of the others, seemed to Deleurye to be the most common, is one of the rarest as a primitive position; and, 5. That, in the iliac positions, the fronto-mental diameter is more frequently directed obliquely than transversely.

It ought also to be known that the face does not always present in full; that the forehead often sinks lower than the chin; that the contrary obtains in other cases; and that in some instances, also, as Nægele and Stoltz think, it descends with one of the cheeks foremost, &c. These anomalies, which constitute the varieties pointed out by Madame Lachapelle, may be either primitive, that is, they may exist from the very commencement of labor, or secondary, that is, not become manifest until after the first efforts, and even at a very advanced stage of parturition. The last case ought to be considered as possible, for example, in vertex presentations with the occiput backwards, or where the pelvis is very large, and also where the sacrum is too concave. M. Chevreul has observed and described none but the transverse or slightly oblique positions. M. Nægele, who has carefully studied their mechanism, is also unwilling to admit any other. P. Dubois, likewise, favors this doctrine, which I adopt as a general rule, but not without exception, as will be seen directly.

A. First Position. Right Mento-Iliac Position.—Third of Bandelocque, M. Gardien, Madame Boivin; 58 cases in 22,248 (Madame Lachapelle).

In the right mento-iliac position, which evidently is a deviation of the first or fifth of the vertex, and ought, therefore, to be, and in fact is the most common (forty-one to thirty-one; fifty-eight to forty-five), the face comes down transversely into the excavation; but, as the length of the neck would not allow the chin to get down to the level of the tuberosity of the ischium without dragging the upper part of the thorax through the superior strait, without throwing the occiput forcibly backwards on to the chest, without putting the whole length of the ver-

tical diameter of the head, protracted as far as the sternum, into the situation that ought to be occupied by the fronto-mental diameter, a rotary movement soon takes place, and changes the relations of all these parts: the chin and front of the neck slide from behind forwards upon the right anterior inclined plane, and lodge in the top of the arch of the pubis, while the bregma slides in an opposite direction, upon the left posterior inclined plane, and proceeds to occupy the anterior surface of the sacrum. The right cheek, at first lower than the left, engages first at the superior strait, and remains supported behind the left pubis, whilst the other, carrying along the face and cranium, rotates from above downwards, and from right to left. After a while, the right side of the chin is seen to appear under the left ischio-pubal ramus. The chin arrives under the symphysis a little later still. The other side of the chin is not long in showing itself under the other side of the arch, and the face finally passes directly into the strait, in place of traversing it diagonally, as M. Nægele believes. Then the forehead, followed by the sagittal suture and occiput, passes gradually down the plane presented to it by the anterior surface of the coccyx and perineum, in front of which all these parts are in succession disengaged. As it emerges from the vulva, the chin rises, by degrees, towards the mons veneris; the hyoidean region, or lower extremity of the vertical diameter, really forms the centre of the semicircle described by the head as it clears the strait, and the rest of the labor terminates as in the corresponding positions of the vertex.

At the superior strait, the anterior fontanelle rises towards the left iliac fossa, and represents the extremity of the diameter ending at the chin, on the right side, and which corresponds to one of the oblique diameters or the transverse diameter of the pelvis. The bi-temporal diameter strongly inclined forward represents the opposite oblique or sacro-pubic diameter. It is the occipito-frontal or occipito-bregmatic which indicates the axis of the strait. As the chin arrives behind the right obturator foramen before the vertex clears the pelvic circle, and soon gains the pubal arch, the occipital portion or largest part of the head, by dipping from left to right and from behind forwards, presents its different diameters very obliquely to the strait, and with respect to its dimensions finds no difficulty in descending into the excavation. The occipito-frontal and occipito-mental diameters, preserving their obliquity from above downwards, invariably cause one of the small circumferences of the head to correspond to the different planes of the pelvic cavity. Finally, at the superior strait the mento-bregmatic and bi-temporal diameters follow the coccy-pubal and bis-ischiatic diameters. As all the other antero-posterior diameters, which terminate by gliding over the anterior edge of the perineum, are in reality nothing but right lines, of which the extremity of the vertical diameter fixed under the symphysis indicates the point of departure, none can offer more than four inches in traversing the strait.

B. *Second Position. Left Mento-Iliac Position.*—Fourth of Baudelocque, M. Gardien, Mesdames Boivin, Lachapelle, etc. 31 to 41; 45 to 58.

Where the chin looks towards the left iliac fossa, the position of the face answers to the second or fourth of the vertex. It is rather more frequently met with than the preceding one, but does not differ from it except that the chin slides on the left anterior inclined plane, and the bregma on the right posterior one, so as to place the head in an antero-posterior direction, in order to pass the perineal strait. In the beginning, the left cheek dips down until it finds a *point d'appui* behind the right pubal ramus. The right cheek then descends from right to left by a sort of see-saw motion. The first presents under the right ramus of the arch before the other, and continuing its first movement reaches the left side of the strait. In engaging under the symphysis the chin tends slightly to the left, although it was at the right in the first position. The bregma presses a little more, for the same reason, the right sacro-sciatic ligament than that of the opposite side, provided it does not rest directly upon the coccyx. Moreover, they are

the same diameters, with the same dimensions and circumferences of the head which present at the openings of the pelvis, and the act of rotation must be somewhat easier, if, as is asserted, it be true that the presence of the rectum may impede that of the right occipito and fronto-acetabular positions of the vertex.

It is said that the head has been, but very rarely, seen to emerge from the vulva in a diagonal or even transverse position; M. Nægele even thinks that this is most frequently the case; but it does not appear to me certain that, in these cases, the observers were not deceived by an incipient act of restitution.

C. Third Position. Mento-Sacral Position.—First of Baudelocque.

The third position is extremely rare, 1. Because the occipito-pubic position, which must give rise to it, is itself not very common; 2. Because, if it be true that it does sometimes or even pretty often exist at the very beginning of labor, the contractions of the womb soon transform it into a diagonal or transverse position; 3. Because, if it should maintain itself for any length of time, the chin, which is too prominent not to lodge against the sacro-vertebral angle, would force the occiput to descend, or swing towards the centre of the pelvis, and at last place itself in the third position of the vertex; 4. Because it is evidently impossible for the chin, which must always appear first at the vulva, to descend in this attitude as far as the anterior edge of the perineum, unless, as M. Désormeaux remarks, the fœtus be an abortion; for the breast would then be entirely within the pelvis at the same time with the head.

The following is, however, possible. If the bregma, turned in front, or slightly to one side, as in the anterior varieties of the vertex, does not take a lateral position, the forehead advances behind the body or the symphysis of the pubis at the same time that the chin descends below the sacro-vertebral angle or the psoas muscle. The entire head engages in this manner as far as the anterior fontanelle for the anterior plane, and so far that the face carries with it the entire fore part of the neck and even the commencement of the breast posteriorly. The occipito-mental diameter, which still represents the axis of the strait, executes a see-saw motion from above downwards and antero-posteriorly. The chin, entering more and more towards the bottom of the excavation, and being retained, moreover, by the thorax, which cannot advance, forces the sagittal suture to glide behind the pubis and the forehead to gain the superior part of the inferior strait. The frontal protuberances lose no time in receiving support from the perineum. The posterior fontanelle descends in its turn, and after a time shows itself at the top of the arch. Finally, the head disengages itself as in the occipito-anterior position. It follows, from this, that the greatest diameter which can present itself to the planes of the straits is the occipito-frontal diameter, and that it engages in such an oblique direction that the head generally offers to the pelvic openings a circumference of only ten to eleven inches. The child escaped precisely in this way in one of the cases observed by Smellie. Other authors, De la Motte in particular, have reported similar cases of the kind.

D. Fourth Position. Mento-Pubic Position.—We have seen above that, if the mento-pubic position, admitted as most common by Désormeaux, is very rare at the commencement of labor, it is no longer the same at the end, since it is by it that the two principal terminate. Having at the same time shown that its mechanism offers no more difficulties than those of others, I do not think it necessary to dwell any longer on the subject for the present.

Thus all positions of the face are possible, and all permit the delivery to terminate without assistance. The two antero-posterior varieties are observed in very small proportion; but M. Nægele certainly goes too far in rejecting them as impossible, when he maintains that the two lateral positions alone require the attention of the student.

In fine, all the face positions may be reduced to one fundamental one, a species which comprises two, or three, or five varieties, right and left mento-iliac, mento-

pubic, and, if it be preferred, two diagonal ones, all of which have, for a last result, the arrival of the chin under the arch of the pubis, in order that the head may pass the inferior strait without obliging the breast and shoulders to descend antecedently thereto into the bottom of the excavation.

Remarks on presentations of the head.—In practice we also meet with certain positions that belong neither to those of the occiput nor to those of the face, properly so called. The head sometimes descends, half turned over, so that neither the occipito-bregmatic nor fronto-mental diameters correspond to those of the straits, but it is the occipito-frontal diameter or circumference, or even, in some cases, the occipito-mental diameter that assumes that relation; sometimes, on the other hand, the head too much flexed occasions a part of the nucha to present together with the occiput. It pretty frequently happens, also, that one of the parietal bones, or the ear, or the temple, being nearly parallel with the horizontal plane of the pelvis, engages first. Lastly, in this respect there are an infinite number of shades of difference, which I do not think it necessary to speak of at great length, because it suffices to indicate them merely to show that they are referable to some one of the correct vertex or face positions; or, again, because they most commonly become causes of dystocia. I will not conclude without remarking, with De la Motte, Smellie, and M. Nægele, that, if delivery by the face carries with it no danger to the child, when it terminates speedily, it is by no means the same when labor is prolonged beyond its usual limits. The reversion of the head on the back, the pressure of the fore part of the neck against the sides on the edges of the pelvis, naturally react in a mischievous manner upon the jugular veins, or perhaps on the carotids; hence the possibility of engorgements, and of effusions of blood in the cranium. The lividity, tumefaction of the entire face, and the bloody tumors which sometimes appear on one of the cheeks, in the same way as on the vertex, are produced by the same cause. The deformity of the mouth, the unequal swelling of the different parts of the face, depend, on the contrary, on the absence of pressure they experienced in traversing the pelvis or on their diversified texture. When the face descends first, writes M. Champion to me, the neck evidently becomes elongated, and the head thrown back so as to press forcibly the root of the cervical region posteriorly, in place of pressing against the upper part of the thorax. The same lengthening is observed in the occipito-posterior positions, and in such a way as to allow the chin to apply itself to the fossa above the sternum rather than the front of the chest. If this twofold peculiarity permits the head to present to the inferior strait diameters of less size, as M. Champion moreover thinks, it causes the fœtus to be also exposed to additional risk, in consequence of the very active traction that the vertebral column experiences.

ART. II.—OF UNNATURAL EUTOCIA (PRESENTATIONS OF THE PELVIS).

611 cases in 20,517 (Madame Boivin); 1390 in 37,875 (Madame Lachapelle); 65 in 1800 (Merriman); 54 in 1897 (Bland); 194 in 6555 (Boer); 61 in 1296 (Nægele); 4 in 100 (Nægele); 4 in 273 (Ramoux); 7 in 85 (Clin. of Strasburg); 391 in 10,742 (P. Dubois); 78 in 2571 (Richter); 7 in 291 (Waller); 79 in 3182 (Trocon); 10 in 208 (Kluge); 183 in 17,000 (Kilian); 5 in 452 (Mazzoni).

The pelvic extremity of the fœtal ovoid comprises the feet, the knees, and the breech; when it presents first at the straits of the pelvis, the labor can most generally be terminated alone, as has been noticed by practitioners in all ages; but this does not warrant us in saying with the moderns that these presentations are natural. Without pretending, with the ancients, and as G. de la Tourette still maintains, that delivery by the feet is always dangerous, or that we should endeavor to bring the head to the strait, in preference to letting the fœtus escape feet foremost; without referring, with Avicenna, to the examples of Agrippa and

Nero, or that of Richard of England, &c., to prove that children born in this way necessarily become tyrants, criminals, or wretches who are a disgrace to human nature, I think we shall be at least forced to admit, with Celsus, Moschion, Paré, De Saint Germain, &c., that this kind of labor is less favorable than that where the other extremity of the occipito-coceygeal diameter presents. It would surely be both a very erroneous and a very dangerous doctrine to say, with Rhodion, Dionis, A. Petit, and Boucher, that delivery by the feet is easier than by the head.

1st. *Dangers*.—All accoucheurs agree that the child is oftener born dead in pelvic presentations than in those in which the vertex descends first. At the Paris *Maternité*, out of eight hundred and four children expelled in this manner, only five hundred and eighty-one were born living; whilst, out of a sum total of twenty thousand six hundred and ninety-eight vertex presentations, only six hundred and sixty-eight were still-born.

After the rupture of the membranes, the pelvic extremity of the fœtus never presents the same evenness, the same resistance, or the same rounded form as the head, to the openings of the pelvis; it consequently acts to much less advantage on the cervix to complete its dilatation. When the head presents, the uterine contractions act upon it, through the medium of the spinal column, as upon a solid body; whilst the pelvic extremity, on the contrary, being soft, supple, and flexible, yields, and is in some measure crushed down. In vertex presentations, the most voluminous part, that which is best calculated to bear all sorts of pressure, escapes first. In pelvic presentations, on the contrary, the point of the cone advances first, so that the fœtus progresses more slowly in proportion as the labor advances. In the former case, the remaining parts of the child are delivered immediately after the abdomen, and neither the thorax nor abdomen is in danger of suffering any injurious compression; in the latter, the belly and the thorax, being obliged to overcome the resistance of the cervix, can rarely support such a degree of pressure beyond a few minutes without the greatest danger; the liver and other viscera of the abdomen must react upon the great vessels; the circulation in the cord, which is pressed against the breast, and the action of the heart, cannot but be very much impeded, if not absolutely suspended. In delivery by the head, the spine represents a long handle of a lever, to which the womb applies itself forcibly until the termination of the labor; in presentations of the pelvic extremity, before the head has completely passed through the superior strait, it is in a great measure beyond the influence of the uterine contractions; at the very moment when the greatest amount of uterine power is wanted, all the benefits of it are lost. Finally, the pressure sustained by the parts, in succession, from below upwards, necessarily drives the blood up towards the head, and determines that state of congestion so often met with in children that are delivered footling, and which Oslander and M. Flamant erroneously attributed to the action of cold air upon the child's body previously to the delivery of its head.*

* The view taken here of the causes of death which so frequently operate effectually on the fœtus in pelvic presentations, omits one of the most considerable, and which appears to me to be readily conceived of in the following manner. When the vertex descends first, in any woman, the child begins to breathe as soon as the mouth and nostrils are exposed to the air, and it generally cries before the shoulders are born; but, when it is enabled to reach the air, it becomes instantly a matter of indifference, as to its security, whether the after-birth be detached or not. Now, it most generally happens that the after-birth is wholly or partially detached, by the contraction of the womb, long before the hips and legs of the child are expelled; for the womb is by this time grown so small, that the placental superficies of it can no longer hold the placenta. This, as I have said above, is a matter of indifference to the child as soon as it can communicate with the atmosphere.

In a pelvic presentation, on the contrary, it is a matter of the greatest consequence to the child's safety, that the detachment of the placenta should not take place so early, for, although the feet or the breech is born, the child's head having no access to the air, it perishes with a

These disadvantages cannot be denied by, or unknown to any well-informed practitioner. If Roeser regards delivery by the pelvis as one of the best that can be effected artificially, M. Carus, on the contrary, believes it to be attended with danger in consequence of the pressure, first of the cord, second of the placenta by the head of the child, from the extension of the spinal marrow, and, especially, from the respiratory efforts of the child, the head being still in the genital organs. It would be wrong, however, to conclude, from the above, that the assistance of art will be always required, merely because the pelvic extremity of the child presents; on the contrary, I think that we should always, in such cases, abandon the labor to the resources of the organism, unless an opposite proceeding should be imperiously demanded by some peculiar circumstances. If the rupture of the membranes does not occur until after the complete dilatation of the os uteri, if the position is regular and the pains good, the fœtus will, indeed, pass out without running much more risk than in a delivery by the head; but, if the membranes give way very early, if the least traction be employed under the pretext of hastening the delivery, it is certain that difficulties will be infinitely multiplied, and the life of the child seriously compromised. This is a point which young students, as well as practitioners, ought never to lose sight of. This, also, is one of the motives that have induced me, both in my lectures and in this work, to deviate from the ideas generally received among us in relation to pelvic presentations of the fœtus.

2d. *Causes*.—Previously to the time when De la Motte, Petit, and Baudelocque had demonstrated that the somerset motion described by their predecessors was a mere chimera; as long as it was supposed that the fœtus naturally remained squatting on the sacro-vertebral angle until the end of the seventh month of pregnancy, there was no difficulty in accounting for the presentations of the breech, knees, or feet. To explain their occurrence, it was sufficient to say that something had prevented the somerset from taking place; that the child, either through forgetfulness, weakness, or something else, had allowed the opportune moment for performing this pretty feat to elapse; but at present, when we cannot resort to this subterfuge, we are brought to confess that the causes of presentations of the pelvis are but little known.

It is probable that, about the period when the length of the occipito-coccygeal diameter of the fœtus begins to exceed that of the transverse or horizontal diameter of the womb, it may happen that the head of the child, being carried upwards by some sudden movement, by the decubitus of the woman, or some other

real, I might say a double asphyxia, to wit, its placenta is separated from the mother, and its lungs receive no air. I am far from asserting that the placenta is detached in all cases at so early a stage of labor as that which I have indicated, though I am free to utter my opinion that, in the vast majority of cases, the placenta is separated by the time the head is fairly born, in ordinary vertex cases.

Such are my views of the principal causes of death of the fœtus, in breech and foxtling cases. It follows, from the premises, that in all such labors the child should be withdrawn as soon as it can be conveniently done.

I am sure that in my own practice the results are far more favorable than those cited by M. Velpeau. I do not think that one-tenth of the cases of pelvic presentation under my care prove fatal to the fœtus—and I attribute this success to the custom which I have adopted, of procuring my forceps in good time, so as to have them at hand, wherever the first examination discloses the existence of a pelvic presentation.

I make very slight tractions on the shoulders in order to facilitate the expulsion of the head—and as soon as I find that the head is not likely to come down, I grasp it in the forceps and deliver it at once. I have safely delivered a number of children which, I think, would have been born dead, but for such a precaution.

In a breech case, the life of the child will be lost by a few minutes' delay in the delivery of the head, and the tractions which are effected by pulling by the shoulders can never be of very considerable force, without injuring its cervical spinal marrow. Hence, whenever any considerable extrinsic force is required, it should be applied by means of the forceps.

—M.

cause, cannot resume its original position. It has been observed, at the *Maison d'Accouchemens* at Paris, and I have had occasion myself to notice it, that presentations of the pelvic extremity are much more common in abortions and in twin pregnancies than in simple labors occurring at full term; and this remark might, perhaps, be used to sustain the above explanation; but how can we refer the cause of this anomaly to the fetus, or to mere peculiarities of attitude in the mother, in those tolerably numerous cases where all the deliveries of one individual terminate in this way, and when it is well understood that a woman having once been delivered of a breech presentation, warrants us in fearing that it will happen so to her again? Would it not rather be reasonable to seek for this cause in the conformation of the womb or pelvis in such a case?

3d. The *positions* of the pelvic extremity may, like those of the head, be divided into regular and irregular or deviated ones. In the former, the thighs are applied against the abdomen, the legs are bent upon the thighs, and the breech and feet present together at the superior strait, and the great occipito-coccygeal axis is parallel to the axis of the pelvic circle. In the latter, the fetus is more or less inclined to the right or left, forwards or backwards; the posterior surface of the coccyx, or one of the tuberosities of the ischia, or the fore part of the legs and the sexual organs, corresponds to the centre of the pelvis; most generally, the latter are reduced to the former as soon as the waters pass off; in other instances, they maintain themselves for a much longer time, retard the labor, and in certain cases entirely prevent it from terminating spontaneously.

The regular positions may also become irregular, especially after the rupture of the membranes, either because the feet continue to descend pressed against the breech; or because one of the legs rises up on the anterior surface of the trunk, while the other is extended, and descends first; or because one of them becomes situated transversely, so that the knee and heel press on two opposite points of the strait; or because one knee descends together with a foot or a buttock, or one of the legs is turned up in front, and the other back; or lastly, because this last-mentioned condition is met with concurrently with one knee, one foot, or a foot and buttock together, &c., but in general they remain frank until the conclusion of the labor. The two legs and thighs then extend, and the feet escape first. At other times, again, the legs rise upwards and the child comes away doubled, or by the breech properly so called. In other instances, the knees alone descend together, the feet continuing to be applied to the ischia, which constitutes presentation of the knees: whence it results that there are really no primitive presentations of the feet or of the knees, and that until the rupture of the membranes, there are no other positions than those of the breech.

Thus these various kinds of positions ought to be considered only as shades of a single and even fundamental species, the *presentation of the pelvic extremity of the fetus*.

Instead of six, Baudelocque proposes only four positions for the breech, feet, and knees; in the first, the back looks forward and to the left, forwards and to the right in the second, directly forward in the third, and directly backwards in the fourth. MM. Capuron and Maygrier have rejected the two latter, and substituted for them two diagonal positions, which renders their classification of the pelvic positions in all respects similar to the one they thought proper to establish for the head. Madame Lachapelle has acted differently; she retains Baudelocque's third and fourth; but, in place of the first and second, she admits two others, in which the back looks directly towards the right, or towards the left side of the pelvis.

One thing seems to me to be proved by this discrepancy: it is that we might, strictly speaking, establish, as M. Flamant has done, eight positions of the breech. But on the subject of the pelvic extremity, I shall repeat what I said in relation to the cephalic extremity: disagreement has arisen on the subject, because, instead

of seeking every possible number and kind, we ought to endeavor to ascertain only such as it might be useful to know.

Admitting that it were not perfectly correct to say, with Mauriceau, Dionis, De la Motte, and Levret, that the loins are, in breech cases, most generally turned backwards, MM. Capuron, Maygrier, Dugès, &c., would not be less in the wrong to assert that they as well as the sacro-anterior positions are purely hypothetical. Asdrubali, who has noticed them, partakes of the opinion of Mauriceau, and of Smellie; and the tables published by Madame Lachapelle show that, out of 1390 cases wherein the pelvic extremity presented, there were thirteen anterior, and twenty-six posterior ones.

Thus the direct positions, either anterior or posterior, are possible, as well as the diagonal ones, and the breech may present in as many ways as the head. Like those of the head, too, these positions may be reduced to two principal ones: the one *sacro-anterior*, and the other *sacro-posterior*. This is the way the ancients understood them, and if Baudelocque could be satisfied with one position for the posterior semicircle of the pelvis, I see not why the three positions of its anterior semicircle should deserve a more special description. In the first, second, and third positions of that author, whether the hips engage just transversely or somewhat obliquely, it always happens that one of them looks to the left and the other to the right, exactly as in the three posterior varieties. In the first case, the occiput always ends by placing itself behind the pubis; in the second, it proceeds to lodge on the fore part of the sacrum, as is observed to happen in the corresponding positions of the vertex. The anterior position differs essentially from the posterior one; but the last two being admitted as possible, it is quite useless, as to practice, to establish others, except as shades of them. It is for this reason M. Payen very properly rejects the third and fourth positions of the tokological table.

The two lateral positions, established by Madame Lachapelle, are all that M. Nægèle is willing to retain. M. Dubois, who adopts this idea, doubtless has not observed that the breech scarcely ever presents in this way at the superior strait, and that it is important at the inferior strait to know whether the back looks first anteriorly or posteriorly, and not whether it is turned to the right rather than the left. Notwithstanding, out of respect for received opinions, I shall not fail to point out the particular mechanism of each one of these shades, and, instead of uniting all the positions of the pelvic extremity in one single genus, I shall for the same reason continue to examine separately those of the feet, the knees, and the breech.

§ 1. PRESENTATION OF THE FEET.

538 out of 37,895 (Madame Lachapelle); 23 in 1800 (Merriman); 18 in 1897 (Bland); 68 in 6555 (Boer).

What I have stated in relation to the dangers of delivery by the pelvic extremity, applies strictly to presentations of the feet. In that case the child resembles a cone or a very sharp wedge, descending from its point towards its base; the bag of waters being generally less regular in shape, more elongated than in other presentations, and almost always rupturing before the dilatation of the neck has had time to be completed, it follows that the pressure upon the fœtus constantly increases from the root of the lower limbs up to the superior part of the chest, and that the viscera are violently repelled from below upwards; in a word, the parts of the woman are dilated, and the passage for the head opened by the hips, the belly, and the thorax. If the abdominal and thoracic cavities were formed of bones as solid, and if their horizontal diameters were of a length equal to those of the head, they would bear the pressure of the os uteri with quite as little inconvenience, and the child would not run much more risk in one way

than in the other; but this is not the case, and I cannot too strongly insist upon the disadvantages of such presentations.

The presentation of the feet has, besides, given rise to the most contradictory opinions. P. of Ægineta ranked it long ago among natural deliveries. Avicenna believed delivery by the feet to be nearly natural. Courtin says it is scarcely preternatural. Mercatus is of the same opinion. Paré regarded it as a little less natural than delivery by the head; and most physicians admit that it is the least dangerous of all the varieties of the pelvic extremity. Sennertus dreaded it so much, on the other hand, that he recommends the rolling of the woman over, pressure on the womb, seizing the mother by the feet, and shaking her. The school of Hippocrates and Celsus, also, laid it down as a rule that the conversion of it should be made; and Deleurye still says that it is not without disadvantage, and that it causes great risk to the child.

The causes producing the death of the child in delivery by the feet have been variously explained. In the opinion of some, it arises from an effusion of blood into the cranium. Gradually forced from below upwards, the fluids determine almost inevitably great congestion of the head. No doubt there is danger here, but it certainly is not the sole nor the principal one. The compression of the cord against the chest, at first by the cervix, and against the pelvis, finally, by the head, on the other hand, explains the matter perfectly, notwithstanding what M. Hervez of Chegoin says about it. By adding to this the detachment of the placenta, which takes place a much longer time before the escape of the fœtus, than in delivery by the head, and the different visceral or vascular pressure of which I have spoken, we can fully explain the difficulty the circulation must experience, and the accidents which may result from it. The soft parts of the pelvis, the neck of the womb, and even the vulva in these cases, react in an unpleasant manner upon the infant, and may produce all the mischief MM. Ritgen and Guillemot dread.

1. *Calcaneo-Anterior Position*.—347 in 87,895 cases (Madame Lachapelle).

A. *First Variety*. *Loins in front and towards the left*.—First position of Baudelocque, Gardien, Maygrier, Capuron, Madame Boivin, and Désormeaux.

In the first position of the feet, the anterior surface of the fœtus looks backwards and to the right of the womb; the right hip is turned towards the left sacro-iliac symphysis, and the left hip towards the right acetabulum; whence it follows that, if the presence of the rectum were the principal cause of the great proportional frequency of the first vertex position, the first position of the feet ought to be more rarely met with than the second; however, the contrary is observed to happen; for, by the statement of Madame Boivin, in a total of 234 labors by the feet, the left calcaneo-acetabular position alone occurred 135 times.

The heels, which previously to the rupture of the membranes are more or less near to the tuberosities of the ischia, do not actually engage within the os uteri, until the moment when the waters run off, and sometimes even much later than that. If the amnios does not give way until after the orifice is properly dilated, the legs and thighs follow the feet immediately, and the hips, which traverse the superior strait in a diagonal position, soon reach the vulva. In the contrary case, all these parts descend slowly, and by degrees, with each returning pain. The fœtal pelvis, before it engages in the inferior strait, generally performs a rotation upon the right anterior and left posterior inclined planes of the excavation.

The left hip occupies the arch of the pubis, while the right hip goes to fill up the hollow of the sacrum. The whole child bends upon its anterior or left side. The right hip advances gradually, as in the *see-saw* movement antero-posteriorly, and depresses, and elongates the inferior edge of the perineum, which it finally clears, whilst the other remains almost immovable at the top of the arch. The belly next passes through the os uteri. The hips, which are freed, recover their original direction by performing a kind of movement of restitution, which carries

the left hip to the right, and the right hip to the left. The elbows, pressed against the ribs, or somewhat in front upon the breast, yield to the contractions of the womb, and descend along with the thorax into the excavation.

The shoulders follow the chest through the abdominal opening of the pelvis, where they remain in the same direction they assumed at the commencement of the labor, that is to say, diagonally, the right before the left sacro-iliac symphysis, and the left behind the right acetabulum. When below the strait, they are subjected to the same pivot motion as the hips, and, like them, are soon placed in the antero-posterior direction.

The head, strongly flexed, follows the upper part of the breast; the ovoid which it represents engages with its apex foremost; its occipito-mental diameter is parallel with the axis of the strait, the plane of which soon becomes parallel to the occipito-bregmatic circumference; the bi-parietal and occipito-bregmatic diameters correspond to the oblique diameters; in fine, the relations of the head to the upper pelvic circle are absolutely the same as in the first position of the vertex; there is only this difference, that the small, instead of the large extremity of the cone represented by the head—the chin, the face and base of the skull, instead of the superior oval and occiput—advance foremost. In place of descending before the other, as the anterior position would require if the head came by the vertex, the left parietal, which has taken the place of the right, is suddenly arrested behind the pubis, in order that the posterior side of the cranium may pass to the bottom of the excavation.

The root of the umbilical cord, the abdomen, and the lower part of the thorax are now emerged; the left elbow appears at the top of the pubic arch; the right elbow, arm, and shoulder slide gradually along the sacrum and perineum, and successively appear in front of the posterior commissure of the vulva, which strongly raises the trunk of the fœtus up towards the mons veneris; so that the shoulder that is in front does not commonly disengage itself until after the other, although the corresponding elbow had appeared at the vulva first. Immediately after this, if not supported, the child falls backwards again by its own weight, and rests on the anterior edge of the perineum; a kind of movement of restitution, which again carries the left shoulder to the right, and the right one to the left side, soon takes place, and the bis-acromial again crosses the occipito-bregmatic diameter at right angles.

When fairly in the excavation, the head revolves on its occipito-mental diameter, so as to carry the face directly backwards, and the nape of the neck and occiput directly in front; the two extremes of the occipito-bregmatic diameter slide from right to left, and from before backwards, on the right posterior inclined plane, and from left to right and from behind forwards, on the left anterior inclined plane, as in the first vertex position, so as to become parallel to the coccy-pubal diameter. The womb can now no longer act immediately upon the head, which is entirely or partly in the vagina, but the disposition to straining, produced by the pressure now experienced by the rectum and bladder, soon compels the woman to gather up all her powers and redouble her courage, and the contractions of the abdominal muscles soon come to the assistance of the powerless womb for whose forces they are now the substitutes. From this moment the occiput receives the whole weight of the expulsive power: in order that it may become parallel to the axis of the perineal strait, the occipito-mental diameter gradually executes a *see-saw* motion, which brings the anterior fontanelle near to the anterior surface of the hollow of the sacrum, and causes the chin to thrust the breast towards the symphysis of the pubis. Finally, the nape of the neck, bearing upon the summit of the arch, as upon a fixed axis, permits the head to describe an arc of a circle, the radii of which seem to have the lower edge of the pubic articulation for their centre, and to be composed of the occipito-mental, occipito-frontal, occipito-bregmatic, and vertical diameters; so that we see the chin, the forehead, and the

anterior fontanelle appear in regular succession at the vulva, after which the occiput escapes from above downwards, and emerges thus from the pelvis to put an end to the labor.

B. Second Variety. Loins forward and to the right.—Second position of Baudelocque, Gardien, Capuron, Maygrier, Désormeaux, and Dugès; 86 times in 234 feet presentations (Madame Boivin); 175 in 37,395 labors (Madame Lachapelle).

In the right calcaneo-acetabular position, the soles of the feet, the foreparts of the legs, and the whole anterior surface of the fetus look towards the left and back part of the mother; the right side is towards the front and left of the mother.

The feet and legs, as in the preceding position, are not mechanically stretched out, and are not really pushed into the orifice, until after the perforation of the membranes. The hips, arms, and shoulders pass through the straits, and present themselves at the vulva in the same way; that is to say, diagonally at the superior strait, and antero-posteriorly at the inferior strait; but the act of rotation takes place from left to right instead of from right to left, as before: both the right hip and right shoulder, and not the corresponding parts of the left side, proceed to lodge in the arch of the pubis; the abdominal surface turns towards the left, and thus takes the situation of the posterior surface, which now looks towards the right iliac fossa; the occipito-mental and bi-parietal diameters, and the occipito-bregmatic diameter and circumference, preserve the same relations with the axis, the oblique diameters, and plane of the superior strait, and with the axis, the coccy-pubal and bis-ischiatric diameters of the inferior strait; but the face and forehead are obliged to descend along the front of the sacro-iliac symphysis, and the pivot motion occurs along the right anterior and left posterior inclined planes; in a word, the second position differs no more from the first than the left hand does from the right; and the mechanism of the one is so similar to that of the other, that it would be really fastidious to enter into any longer details concerning it.

C. Third Variety. Loins directly in front.—Third position, Baudelocque, MM. Gardien, Maygrier, Capuron, Désormeaux, &c.; 7 in 234 (Madame Boivin); 8 in 235 (Madame Lachapelle).

It is true, we find undoubted instances of the third position in Mauriceau, Smellie, and Levret, &c.; but, as these authors, as well as De la Motte, Deleurye, and Asdrubali, did not distinguish them from the two preceding ones, we cannot ascertain in what proportion they met with them. Be this as it may, we do not perceive that the form of the strait can in any way prevent such a presentation from taking place; the pelvis is wide enough in front to admit of the two hips engaging in it transversely; the sacro-vertebral angle might very well lodge betwixt the thighs or legs of the child, whether flexed or extended; the belly and breast are too easily depressed to occasion the least difficulty in this respect; and the shoulders themselves would pass transversely through the strait as easily as the hips. As to the head, although in penetrating to the excavation it would not experience more, or might have even less difficulty, than if the vertex were presented in the third position, it notwithstanding rarely fails to deviate to the right or left side of the promontory. It is easy to see that in this respect there has been more dispute about words than things. In fact, if those accoucheurs who reject the third position of the feet, admit under that title only those cases where the middle line of the child's back glides along behind the symphysis pubis to the very close of labor, they are no doubt partly right, and such a labor must be extremely rare; but if, on the contrary, in order to constitute such a case, it suffices for the child to descend in this way until the arrival of the head only, we should be ignorant not merely of its possibility, but also of its very great frequency.

During the progress of the labor, then, this third position almost always converts itself, a little sooner or later, into the first or second; sometimes it lasts only until the arrival of the hips at the superior strait; sometimes it maintains itself until the shoulders engage; sometimes it is not converted into a diagonal position until the breast has descended quite into the excavation; finally, it may happen that it does not become converted at all, and then one of two things is observed to take place: either the hips, the shoulders, and the head do not turn upon their axes at the abdominal strait, in the excavation, nor at the inferior strait, and the child's back continues to look to the front of the mother both out of the pelvis and inside of it, and there is no pivot movement within the pelvis, nor restitution outside of it; or, on the other hand, the hips and shoulders, which were engaged transversely at the upper strait, place themselves in an antero-posterior direction to pass through the vulva—in which case the head is the only part that does not turn on its axis.

2. *Calcaneo-Posterior Position*.—Fourth position of Baudelocque, MM. Gardien, Désormeaux, &c.; 10 in 538 (Madame Lachapelle); 6 in 234 (Madame Boivin).

Under the title of fourth position, Baudelocque comprised all the cases where the dorsal surface of the fœtus looks towards any point of the posterior half of the superior strait, and not merely those in which it is turned directly backwards, as we might be tempted to believe from reading a great number of modern works. In this respect he has only imitated Mauriceau, Dionis, De la Motte, Portal, Smellie, Asdrubali, &c.

In the usual dorsal state of the fœtus, the soles of the feet, the foreparts of the legs, and the forehead and abdominal surface of the child are directed forwards. The lower limbs being more or less rapidly extended and elongated by the uterine contractions, they pass through the vagina, and reach the vulva; the hips soon follow, and sometimes pass the superior strait in the direction of the bis-iliac diameter, more frequently in that of one of the oblique ones, or at least, after being slightly inclined, one forwards and the other backwards, provided they were previously quite transverse. When in the excavation, they are observed to engage in the perineal strait; sometimes parallel with the bis-ischiatic line, at others by following the oblique diameter, and most frequently, after one of them has been placed behind the symphysis pubis, and the other in front of the sacrum.

The arms and shoulders present themselves in their turn, and act like the hips, with the exception only, that they more rarely fail to execute the pivot motion before they pass through the vulva, even though they had previously affected a transverse position. Being repelled by the anterior edge of the perineum, these different parts, as they emerge, are raised upwards towards the mons veneris. To accommodate itself to the curve of the pelvis and genital parts, the fœtus bends in the shape of a very long arc of a circle, convex behind and concave before, as it does in an anterior position. The elbow that is below the pubis shows itself first at the upper part of the vulva; but the opposite arm and shoulder, more particularly urged by the efforts of the womb, proceed from behind forwards along the posterior median line, and actually are the first to escape from the pelvis; the edge of the perineum immediately afterwards retires from the neck, as if to permit the trunk to fall back towards the anus, and the other shoulder to disengage from beneath the pubic symphysis; the back then turns back again, as by a sort of movement of restitution, which replaces the shoulders, the one to the left and the other to the right, or diagonally. The head cannot become engaged without being strongly flexed; on the one hand the occiput almost invariably deviates towards one of the sacro-iliac symphyses; on the other, the occipito-frontal diameter, or even the entire head, represents a lever of the first kind, whose anterior extremity more particularly supports the action of the expulsive powers. The chin, although more or less prevented by the breast, ends, however, by being depressed,

and the occipito-mental diameter by finding itself almost parallel with the axis of the strait; the forehead and anterior fontanelle come, one after the other, to hide behind the symphysis of the pubis, and thenceforth the occipito-bregmatic circumference is in correspondence with the plane of the pelvic margin, as in all the anterior positions.

When in the excavation, the head rolls on the inclined planes, replaces itself in an antero-posterior direction by means of the pivot motion, and afterwards glides with much more difficulty than when the occiput is forwards; the breast, which is situated in front, opposes the lowering of the chin; the occipito-bregmatic diameter, which is three and a half inches long, not being able to place itself in correspondence with the antero-posterior diameters of the excavation and apex of the pelvis, has its place occupied by the occipito-frontal diameter, which has an extent equal to at least four inches. The face, and particularly the forehead, are too broad and ill-disposed to fit the form of the pubic arch so exactly as the nape of the neck and the occiput do; finally, the shoulders hardly emerge before the chin presents itself at the vulva.

Nevertheless, immediately after the expulsion of the thorax and upper extremities, the upper and hinder part of the neck rolls from before backwards upon the anterior edge of the perineum, as upon an axis, and the nose, the forehead, the anterior fontanelle and remainder of the head successively disengage, by forcing the breast backwards. It is possible, also, and Le Roux reports a case of it, that where the chin is, as it were, caught on the anterior edge of the superior strait, the occiput dips down and descends the whole length of the posterior wall of the excavation in order to escape first in front of the perineum by forcing the body towards the mons veneris, and in such a way as to cause the face to be disengaged last. We find a case of this kind in the thesis of M. Eckardt, and the delivery terminated of itself. There is no difficulty in understanding the mechanism of this phenomenon. The extremity of the occipito-mental diameter resting in front of the strait causes the whole effort to bear on the posterior part of the cranium, and the occipital extremity of this diameter is obliged to descend first by describing the arc of a circle from behind forwards, in order to reach the vulva, as in the anterior positions of the vertex. We shall see further what part M. Michaelis has thought proper to take in relation to this particular.

Remarks on presentation of the feet.—The mechanism of this position, as now seen, is very unfavorable, and much more difficult than that of the calcaneo-anterior positions; if the chin or forehead lodge upon the upper edge of the pubis, the act of flexion of the head is prevented or destroyed, and the occipito-mental diameter, or the occipito-frontal diameter and circumference, occupy the situation of the occipito-bregmatic diameter and circumference. Then the labor cannot be terminated without assistance.

It would, notwithstanding, be wrong to conclude, with G. de la Tourette, that art must of necessity aid the economy in all the posterior positions of the feet: attempts to change them would favor the reversion of the head, and most frequently produce just the state of things which it is desired most carefully to avoid. Besides, nature, when left to herself, generally succeeds better than any foreign power in flexing the head and placing it diagonally at the superior strait.* In a very great majority of cases this position spontaneously converts itself into an

* The best position for the woman, in this labor, is that on the left side, with the thighs strongly flexed. As soon as the shoulders are delivered, the body of the child should be turned back towards the woman's buttock, so as to give greater facility to the flexion of the head. At the same time that the child is pressed backwards, the edge of the perineum should be pushed towards the coccyx, in order to let the nape of the child's neck retreat as far as possible. When this can be done, a finger in the child's mouth will easily depress the chin, and thus effect the desired degree of flexion. I have succeeded in this way several times without any difficulty.—M.

anterior position, either suddenly, after the head has got into the excavation, or, on the other hand, gradually, in proportion as the hips, the shoulders, and the head itself present.

In a case of this kind I have seen the hips emerge transversely from the vulva, turn in the direction of the oblique diameter that extends from behind and from right to left, then place itself in the antero-posterior direction, as the shoulders became engaged, then continue their rotation movement after the escape of the latter, and at last turn quite across, with the back in front, yet the head escape as in a direct anterior position. Now this is what almost always happens if the accoucheur is skillful enough to do *nothing*, to content himself with sustaining the fœtus, as it passes the vulva, without employing the least traction.

If the *loins* are sometimes *turned directly to the left or right*, which cannot be doubted, inasmuch as Madame Lachapelle informs us that she had seen it so, we may be at least allowed to suppose that in this respect persons have been often deceived by the oblique position that approaches most nearly to it. But for this, the celebrated midwife would not have said that, out of 1038 labors by the feet, there were found to be 347 left iliac positions, and 175 right iliac positions; moreover, by the admission of Madame Lachapelle herself, the really lateral positions almost always convert themselves into anterior or posterior, diagonal or direct positions.

In all the feet positions, the hips and shoulders ordinarily execute a *rotary movement*, previously to engaging in the inferior strait. According to Baudelocque, this movement may, however, possibly not take place, and the parts may, therefore, continue parallel to the bis-ischiatic diameter. According to most of the modern accoucheurs, on the contrary, the hips and shoulders almost never pass the vulva otherwise than parallel with the coccy-pubal diameter. To reconcile these two extremes, there remained an intermediate opinion, and Madame Lachapelle embraced it, maintaining that the pelvis and upper part of the thorax pass through the inferior strait, in an oblique or diagonal direction, and not in a directly transverse or antero-posterior direction, strictly so called. For my own part, if I can believe my own eyes, both parties are right; an error is found only in the exclusion by which each party endeavors to put down the other.

The arms.—All the accoucheurs, both ancient and modern, have maintained, that in delivery by the feet, the arms rise along the sides of the neck and head. Wiedemann was one of the first to oppose this doctrine, and he pretends that they always remain applied against the breast, if no tractions of any kind are exercised upon the fœtus. M. Désormeaux and Madame Lachapelle adopted this opinion also. In the deliveries by the feet that have fallen under my notice, the forearms and elbows did not abandon the breast, and always escaped before the shoulders, when the woman was left to her own powers, and nothing more was done than to support, without pulling at, the trunk until the expulsion of the head.

Though so many authors have professed the opposite opinion, which still prevails very generally, it depends solely on the circumstance, that the persons who assist lying-in women rarely consent to remain inactive in a footling delivery. They lay hold on the members that spontaneously present, and the very natural, and in itself considered, laudable desire to put an end to the sufferings of the mother, causes them to pull with more or less force upon the child, and a phenomenon which is produced merely by art, is then very readily mistaken for a natural one.

Where the womb, assisted by the muscular contractions of the abdomen, is alone charged with the duty of expelling the ovum, all the parts of the child are pushed down simultaneously, and so folded and pressed together, that it is very difficult for one of them to rise upwards while the others are descending.

As the uterus does not contract from its fundus towards its cervix only, but also circularly, from above downwards, by a sort of vermicular or peristaltic movement, the elbows or arms run no risk of lodging against the upper edge of the pelvis.

If, on the contrary, the foetus is *extracted* and not simply *expelled*, as the tractions come to act ultimately upon the breast and head, it follows that these parts only are dragged downwards, while the arms, retained in their position by the womb, remain where they were, and can only descend in the direction extending from the shoulders towards their free extremities.

Nevertheless, I do not believe it right to deny, as Madame Lachapelle does, the possibility of the phenomenon admitted by the older accoucheurs in every spontaneous delivery. We may conceive that the arms, when once they have reached the excavation along with the shoulders, being no longer directly urged by the uterine efforts, may rise upwards by sliding along the sides and forepart of the breast, or rather, that the head, supporting, from this moment, the whole action of the expulsive powers, may cause the face and breast to descend into the inferior strait, without necessarily carrying the elbows along with them. It must be so, further, since M. Gardien affirms that in many labors terminated by the feet without any assistance, he has seen the arms rise along the sides of the neck and head, and since M. Deneux told me he had observed the same thing.

§ 2. PRESENTATION OF THE KNEES.

4 in 20,517 (Madame Boivin); 9 in 22,243 (Madame Lachapelle).

The presentation of the knees being in all respects like that of the feet, it is useless to give the mechanism of it apart; in fact, whether the legs have descended, or remain bent upon the thighs, the lower extremities traverse the os uteri and straits of the pelvis with equal facility. Perhaps they descend with rather less facility in the second than in the first case mentioned, provided the membranes give way when the neck is still incompletely dilated; but the knees scarcely reach the vulva before the legs become extended, and thenceforth everything proceeds as if it had been a footling case.

The knees present first, because they have been reversed, either mechanically or by muscular action, in the cul-de-sac formed by the apex of the ovum, at the moment when the membranes are ruptured, or because the rush of fluid forces them along with it, rather than the feet, which may be farther from the orifice; or because the breech, which presented first, mounts upwards again along with the feet, under the influence of the contractions of the womb, so that the knees only can be depressed into the opening of the neck; or yet again, because, after the discharge of the waters, the legs are situated crosswise above the uterine orifice, or have been arrested against two opposite points of the strait. Moreover, we may conceive that they may both descend at once, or only one of them along with one foot, without that circumstance changing the progress of the labor; and it was entirely wrong to attribute more danger to delivery by the knees than to those that take place by the feet. It may, however, happen that one of them, or even both of them, may become propped up against some point of the pelvis, against the floor of the excavation, for example, while the feet are fixed against some point directly opposite. The legs are then completely across. They deaden the expulsive efforts, and descend neither by one end nor the other. But it is so easy to remedy this anomaly when it delays too long in spontaneously disappearing that it scarcely deserves the name of accident. The original descent of the feet is, moreover, sometimes followed by it in their posterior positions. By making a *point d'appui* of the inferior wall of the pelvis, they resist and force the knees to descend and to become wedged in front.

§ 3. PRESENTATION OF THE BREECH.

837 in 37,895 (Madame Lachapelle); 373 in 20,517 (Madame Boivin); 42 in 1800 (Merriman); 36 in 1897 (Bland); 126 in 6555 (Boer).

Presentation of the breech has always been regarded as more dangerous, difficult, and unnatural than that of the feet or knees. It was thought, that the size of the buttocks would not admit of the expulsion of the child, without the neck of the womb, as well as the perineum, being violently contused or extensively lacerated; but even had experience not pronounced upon the value of these exaggerated fears, a moment's reflection would have shown how unfounded they were. It is merely necessary to recollect the dimensions of the foetal pelvis, to be instantly convinced that, even together with the thighs, the size of the breech could never form an insurmountable obstacle to delivery, unless there was some faulty conformation of the straits. When the child comes doubled, the pelvic extremity is too supple, too flexible, and accommodates itself too easily to the form of the openings it has to traverse, for it to expose the neck of the uterus and the perineum, any more than the head does, to the lacerations of which we have spoken.

In presentations of the feet or knees, the bag of waters is in general more elongated, tears more readily, and the os uteri has less need of being so largely dilated. With the breech, on the contrary, the amniotic sac is as large as in a head presentation, and does not open until it has produced a considerable dilatation; the buttocks and hips, which have to open a passage, react without inconvenience against the resistance of the neck; the belly and breast pass the straits and vulva without the risk of a very violent pressure; for, excepting the head, the hips exceed, as to dimensions and firmness, any other part of the child. Courtin has already remarked, that delivery by the buttocks is the most natural after delivery by the head, and Rhodion does not seem to dread it any more. Deventer says it is the best presentation after those of the head, and Deleurye thinks it less dangerous than authors have been willing to say. But this opinion, in consequence of Denman having said that children which come by the breech generally die, and Baudelocque maintaining that delivery by the buttocks is always more difficult and more painful than by the feet, has continued to prevail.

In breech cases, it is true that the labor, in general, goes on very slowly until they have passed through the cervix, and sometimes even until they have traversed the vulva; while in feet or knee presentations, it seems, at first, that the process of child-birth is going to be extremely prompt. But these differences are all in favor of breech positions; for in the second case, the phenomena then succeed each other in producing so much the less effect as the body is nearer being completely expelled; while in the first case, where the hips have once descended into the vagina, the rest of the body emerges with much less difficulty. I dwell upon this idea because it is well calculated to show how imprudent it may be, in a presentation of the pelvic extremity, to bring down the feet artificially, with the sole view of hindering the breech from engaging first before the dilatation is completely effected. M. Guillemot, who has declared in favor of this doctrine, already adopted by Flamant, insists, with reason, as some one had recommended at the time of Baudelocque, and contrary to the latter author, that we should endeavor to make the buttocks descend by themselves when the feet or the knees are on the point of engaging. Mauriceau, who had one delivery by the buttocks, says also that it is better to deliver the child that way than to bring it out by the head.

Baudelocque admits four positions for the breech, as he does for the feet, and divides them in the same manner; M. Flamant reckons eight of them, and MM. Maygrier and Capuron four, as for the head, &c.

Without speaking of the cases where the foetus engages squatting, having the heels glued, as it were, against the ischia, cases in which art is almost always

required for the assistance of nature, I must say that, in women endowed with but little moral and muscular energy, the softness and flexibility of the breech will absorb the greater part of the motion communicated to the spine of the child by the womb, which often ends by falling into a state of inertia, and that the labor cannot then be always abandoned to itself without danger; besides, in the three anterior positions, the external organs of generation of the male sex are exposed to frictions more or less violent against the promontory. And shall we also agree, with Mauriceau, that it is also by no means rare to find black and contused ecchymoses in new-born children that come by the breech?

Whether the buttocks have passed the upper strait in a transverse or oblique direction; whether the back is in front or rear, it is not less a rare thing for them to fail to place themselves in an antero-posterior direction in the excavation. Being strongly pressed against each other, they swell. In boys, the scrotum becomes puffed and infiltrated. As they curve towards the pubis to gain the vulva, they distend the perineum almost as much as the head does, the form of which they partly simulate. They are next seen to disengage of themselves, and then everything goes on as in a footling labor.

1. *Sacro-Anterior Positions.* A. *First Position.*—In the left sacro-anterior position, the hips engage in the same way as the parietal bones in vertex presentations. The left hip, which at first is lower, is firmly pressed against the side of the pelvis. The right or posterior hip then descends and glides over a great portion of the excavation. The first passes obliquely under the pubic arch; the other reaches, by degrees, the anterior margin of the perineum. The hips having once passed, the pelvic extremities escape, and the labor becomes of the first position of the feet.

B. *Second Position.*—If the back of the child looks in front and to the right, the hips present in the left oblique diameter. The right hip descends first, and presses down behind the left side of the pelvis, while the other becomes well engaged in the excavation. It is this also which appears first under the left branch of the pubis, so that the posterior hip may glide over the right sacro-sciatic ligament, the coccyx, and the perineum. Both hips escape from the vulva together, and the labor is terminated as in the second position of the feet.

C. *Third Position.*—When the dorsal surface rests in front, the hips may engage crosswise, and may thus pass the inferior strait. Nevertheless, most frequently they rotate and present diagonally at the vulva, as in one of the preceding positions. These transverse positions at the inferior strait have no other inconvenience than the exposure of the scrotum to contusion, as in its passage it may be pushed over the point of the coccyx.

2. *Sacro-Posterior Position.* *Fourth Position.*—The anterior surface of the fœtus being directed forward in the three shades of the fourth position, exposes the scrotum less to contusion, and has on this account some advantages over the anterior positions. For the rest, the hips then engage crosswise or diagonally, so as to determine the rotation of the shoulders, then of the head, and to favor the conversion of this into an anterior position.

ART. III.—OF THE CONDUCT OF THE ACCOUCHEUR DURING LABOR.

When called to a woman who supposes herself to be in labor, there are two ways in which the accoucheur may behave, according as he may have for a long time enjoyed her confidence, or as he may never have been much acquainted with her before.

In the former case, he should examine at once, in order to ascertain whether the labor has really commenced; in the latter, it is often necessary to be not quite so much in a hurry, unless indeed the labor seems to be very far advanced.

He may begin to talk about one of the thousand subjects of futile conversation

that everybody understands, and which admits of only a gradual approach to the principal object. In this way, time is allowed for quieting the agitation commonly occasioned in most women by the presence of a stranger, and particularly an accoucheur. During this parley, he should endeavor to possess himself of the shades of character, the caprices, tastes, and habits of the person he is called upon to direct, in order to adopt such a plan of conduct as is most likely to inspire her with great confidence in her attendant; the subject of her pregnancy is soon brought up, the symptoms that have accompanied it, the peculiarities that have marked it, and its term; he may ask whether she has had several pregnancies, or whether this is the first; he can ask about the general state of her health, the inconveniences and diseases that she has heretofore suffered, after which he may be allowed to think of the labor properly so called.

§ 1. OF THE DIAGNOSIS.

Nothing is easier, in the opinion of bystanders, than to say whether a woman is in labor or not; but this is not the case with the well-instructed physician. As women in their first child-birth lack a term of comparison, they very frequently deceive themselves in regard to the sensations they experience; even in the second, third, or fourth pregnancy, women deceive themselves sometimes. How often have the neighbors, relations, the midwife or accoucheur been seen to fix and arrange every necessary preparation for the birth of the child, and the supposed labor cease for a whole month or six weeks, just when the bed had been made up for the reception of the woman, and when the clouts, the ligature for the cord, the scissors, the caps and other clothes of the child, were only waiting for the arrival of the stranger to be applied to it! How often have even still greater mistakes been committed! Who does not know how poor women have been kept for days together on the child-bed, even by physicians, and at last found that their pregnancy was several months off from its close, or even that they were not pregnant at all! A young woman, in her ninth pregnancy, was seized with pain, and thought herself at term; several accoucheurs were called in succession. One said that the bag of waters was formed; another, that the head was about to engage; a third, that he could not find the os uteri; a fourth, that the forceps must be applied. This poor creature, in despair, sent for me on the fifteenth day; I found the cervix as it is at the seventh month; there was an anterior obliquity of the womb; I stated that labor had not begun, and would not take place for more than a month—and applied a broad bandage round the abdomen. In a month, a student, who stayed by her, came to tell me that the os uteri was dilated, and delivery about to take place. I repaired to her, found no symptom of labor, and, in fact, the child was not born till a month afterwards.

It imports us, therefore, to be on our guard against such causes of error; and it is easy for those who have any positive knowledge of tokology to do so.

A. *Pain*.—The pains of labor, the *true pains*, are intermittent, separated by intervals more or less short, progressive, return at regular periods, are not accompanied with tenderness of the abdomen, nor heat of the skin, nor fever; they begin in the neighborhood of the umbilicus, and end in the pelvis or flanks.

Pains foreign to labor, *false pains*, are, on the contrary, vague, irregular, sometimes more, sometimes less acute, do not entirely cease, increase under pressure, and are, most commonly, accompanied with fever or some kind of functional disturbance; they announce a lesion of the stomach, the bowels, the liver, the kidneys, the bladder, or some other organ contained in the abdomen, and have been called *false* because they are entirely unconnected with parturition, appear in pregnant women as they do in those who are not pregnant, or as they do even in persons of the other sex. Nothing, therefore, but the greatest want of reflection can cause them to be confounded with the true pains—those which depend upon the contractions of the womb.

I, however, ought not to omit speaking of a state that might render this discrimination very difficult, and a mistake at the same time highly dangerous: if an inflamed point be established in the neighborhood of the womb, in that organ itself, in the bladder, rectum, &c., just as labor comes on, the pains of childbirth will progress just as those of the disease do; and if it were absolutely necessary to decide from the testimony of the pains alone, the most skillful person might be led into a mistake. But the science possesses other means of ascertaining the existence of labor. If, when the suffering is at the height, the hand, placed upon the hypogastrium, feels the womb grow hard, contract, and become rounder, it is decided that child-birth is about to take place, and, in this case, the true pains may exist alone, as they may also be met with in conjunction with false pains.* If the hand discovers the womb to be unmoved, without action, and without connection with the cries uttered by the patient, it may, to a certain extent, be affirmed that the labor has not begun.

B. *State of the os uteri.*—In fine, we are by the touch enabled to solve the question without any fear of being deceived. While ever the cervix is still uneffaced, while it retains some few lines of length as a canal, we may, in general, assert that the woman is not at full term; only we must avoid mistaking the lips of the os tincæ for the cervix itself, and remember that in persons who have had several lyings-in before, it is now and then found to be extremely soft and very wide, several days or even several weeks previously to the end of pregnancy; and that in such women the orifice frequently forms a cushion or an edge several lines in thickness at the commencement of labor. If it be a first labor, the cervix does not begin to gape antecedently to the appearance of the true pains, and if it feels like a tubercle, pierced through its centre, we may be satisfied that there have been as yet no uterine contractions; where, on the contrary, it is thin, like a sharp circle, the gestation is necessarily at its term, and if the parturition have not commenced, it is almost a matter of certainty that the labor will not fail to show itself within a few days.

To obtain a decisive proof on this point, we have, at most, only to touch during a pain; if the finger feels, in such a way as to admit of no doubt, that the membranes become tense, that they try to engage in the os uteri, which manifestly becomes thinner, contracts, or opens a little, to return immediately afterwards to its primitive condition, nothing further is wanting—the labor has begun. If nothing of all this is observed, we may be content; the moment for lying-in has not arrived.

C. *False Pains.*—However, I cannot quit this article without calling the attention of young practitioners to a peculiarity in the diagnosis that is not sufficiently known, and which might lead them to deceive themselves, after what has been above said. Modern accoucheurs have with one accord rejected, as among apocryphal or ill-understood facts, the very numerous cases tending to prove that labor may begin, the contractions of the womb be brought into evident play, and that, after having continued for several hours, the labor may be suspended so that delivery shall not take place for a whole month afterwards. Such anomalies as these have been cited chiefly on occasions of protracted gestation, and as proofs of superfoetation. It has been pretended that such powerless efforts as the above had masked the natural term of gestation, and that the time that elapsed betwixt their cessation, and the real labor, was an excess over nine

* Let not the inexperienced practitioner be led by this statement into the mistake of supposing that where the abdomen, in these pains, grows hard, and then relaxed, again to become hard upon the recurrence of pain, the labor is actually begun. M. V.'s remark is true as applied to the hardening or contraction of the womb itself; yet, in some cases of false pains, I have observed that they were connected with a spasmodic constriction of the abdominal muscles, which yielded to the touch a sensation closely resembling that of the womb under contraction.—M.

months. But I have acquired the conviction that this incomplete labor, or, as Levret calls it, *false labor*, is not a mere chimera. In March, 1824, I was called to a woman in the Rue d'Orleans, in her second pregnancy, and who had been in pain for about four hours; the pains were regular, weak, and separated by pretty long intervals; the os uteri, which was very soft, and wide enough to admit the introduction of three fingers, was not completely effaced; the point of the ovum had already begun to engage within it; and when the pains came on, the membranes were on a level with the top of the vagina, and became smooth and tense, while, on the other hand, I felt the orifice and body of the womb harden and contract with a certain degree of energy. It was ten o'clock at night; I announced that the labor would not terminate for several hours. I returned home after giving orders to send for me as soon as the waters should break; not being sent for the next day, nor the day after, I supposed they had had recourse to the advice of some other practitioner, and thought no more of it. Six weeks afterwards, being called upon again, I confess I was surprised, for I supposed the woman had been delivered long before. This time the symptoms persisted, and delivery took place. M. Nivert has published, in the *Clinique des Hopitaux*, a case of the same kind which he met with at my amphitheatre. MM. Gerdy and Tanchou assure me that they have witnessed cases nearly similar; and I have myself since met with two others, and I have made it the subject of a special article. Mauriceau speaks of a woman who was similarly affected in the sixth month of pregnancy, and who, nevertheless, was not delivered until the full term. De la Motte gives another instance which took place thirty-five days before true labor. It manifested itself three weeks only before full term, according to Smellie's observation. M. Mesnard has noticed the waters to pass away twelve days before the time in one case, two months in a second, and one month in a third; in fact additional instances will be found in this work in the article "Abortion," in that of Morlanne, and of a host of other observers. I will add that, in some women, labor is at first established during several hours, to disappear afterwards and return in the same manner each day, so as to last one or two weeks. I have seen several women in this condition; one in particular, who in this manner suffers from ten to fifteen days the pains of labor.

§ 2. TO DETERMINE THE POSITION.

When the existence of labor is no longer doubtful, we must endeavor to learn in what position the fœtus presents.

A. *The Vertex*.—The vertex is in general easily known by its round and regular shape, by the posterior fontanelle and occipital point, by the anterior fontanelle, the sagittal, transverse, and lambdoidal sutures, and by the parietal protuberances; however, when the head has been for a long time engaged, the teguments occasionally form so large a tumor upon its summit, and it is itself sometimes so elongated, that one has need of some practice in order not to mistake it. It is in many cases so movable, and particularly so high up, as to render it difficult to distinguish it with certainty from any other part. As long as the membranes remain unbroken, we ought, besides, not to try to reach it except in the absence of the pains; otherwise we should be liable to rupture them prematurely. We can, therefore, best judge of the presentation of the fœtus, at the moment when the waters come off. The upper oval of the head may then be touched throughout its whole extent. The integuments are not yet swelled, and the bones have not had time to ride over each other.

In the three varieties of the occipito-anterior position, the posterior fontanelle approaches more or less near to the pubal semi-circumference of the pelvis, and is behind one of the acetabula or the symphysis pubis, while the frontal fontanelle is more or less elevated behind, and looks towards the opposite point of the pelvic cavity; in the varieties of the posterior position, the fontanelles are disposed of in

the inverse directions. Although it approaches very near the centre of the straits, the posterior fontanelle, notwithstanding, almost never corresponds to it exactly; both in the anterior and posterior positions, this fontanelle is always placed upon a much lower plane than that occupied by the anterior fontanelle. In order more correctly to distinguish the different varieties of the vertex, we should endeavor to recognize the sutures; by adding their direction to the notions we derive from the particular situation of the fontanelles, it is commonly easy to avoid confounding the anterior with the posterior varieties, and to attach to each shade of one and the same position those characters by which it is separated from all the others. When the occiput presents to the left acetabulum, the finger, starting from the posterior fontanelle, finds, 1st, in front the right branch of the lambdoidal suture; 2d, behind, the left branch of the same suture; 3d, on the right, the sagittal suture a little raised on the left side; 4th, beyond and higher up, the anterior fontanelle with the four sutures that branch from it.

For the right occipito-cotyloid position, the left branch of the lambdoidal suture must be found in front, and its right branch in the direction of the right sacro-iliac symphysis, the sagittal suture directed from right to left, and somewhat raised behind above the anterior parietal eminence, the anterior fontanelle to the left, and behind with the coronal suture passing obliquely from left to right, and from before backwards.

In the fourth position, the posterior fontanelle should be looked for behind and to the right. Thence follow the sagittal suture to the left and in front, where should be found the anterior fontanelle much less elevated than in the former positions, but much more so than the occipital fontanelle would be in its situation. The coronal suture has taken the place that the lambdoidal occupies in the first position.

The fifth differs from the preceding only inasmuch as we must seek posteriorly and to the left the objects that were posterior and to the right, then in front and to the right those that were in front and to the left.

Amongst the causes of error against which it is important to guard, I will mention: 1st. The absence of ossification to such a degree as to simulate a fontanelle in the line of a suture, as I have observed in the middle of the frontal suture: 2d. The abnormal division of the occipital by the prolongation of the sagittal suture: 3d. The angle of each of the parietal bones, whether in front or behind, which may be mistaken for the angle even of the occipital bone. To be more certain, it is well to feel in succession with both hands after the example of Mr. Champion, who has found this plan answer very well.

B. *Face*.—The *face* is so different from every other part, that, at a first glance, it seems impossible to mistake such a presentation: this is an error; the proof of the contrary is contained in all the collections of cases, and is daily met with in practice; the chin may be mistaken for the elbow, the shoulder for the heel or the knee; the mouth for the anus, the nose for the sexual organs, and the cheeks for the tuberosities of the ischia. Lest the testimony of an infinite number of learned observers should not suffice to demonstrate the possibility of such mistakes, I will relate a well-known anecdote of a former professor of midwifery at the *Ecole de Paris*: being a man of a rather decided character, he had just *touched* a woman in labor, and supposing he had found a face presentation, he asserted with great gesticulation that such a position could in no case be confounded with one of the breech, not perceiving that his finger, which was covered with meconium, was giving him the lie, in the faces of the students, who could not help bursting into loud laughter. An English practitioner, who called in Mr. Blundell, said that he had his finger in the mouth. The event proved that it was a breech presentation.

It is chiefly in cases where the soft parts of the face have had time to swell and puff up, that we may be readily deceived, especially when the mind, preoc-

cupied with such or such a position, receives, with a sort of avidity, the most equivocal signs as certain proof of what we had predicted. With proper attention, however, we shall be enabled, without difficulty, except in a few very rare cases, to recognize the face whenever it presents, and the rupture of the membranes allows us to examine it naked; the eyes and eyelids, the nose and lips, the alveolar arches and tongue, the chin and ears, which are found near at hand, possess characters too decided for the positions of the face not to be always clearly ascertained.

C. *The Pelvis*.—1. The *feet* cannot deceive the accoucheur when they present: the heel, to be sure, has some resemblance to the elbow, and the toes some similarity to the fingers: but when we remember the difference of length between the latter named parts—that the one are arranged upon the same line and are short, that the others are of unequal lengths and much flexed; when we reflect on the form of the ankles and legs, one must be very careless to compare it with the fist and forearm, and not to distinguish the feet from the hands, excepting when these parts are still above the superior strait.

2. The *knees* might, indeed, be mistaken for the elbows or shoulders, although rounder than the former, and smaller than the latter. But as two elbows cannot, any more than two shoulders, present at once at the strait, we may be sure that they are the knees, from the mere fact that there are two such tumors together in the strait at the same time; and, as a single knee is generally accompanied with one foot, or at least with the breech, it will always be easy to satisfy ourselves that we are touching some part of a lower extremity, and not one of the arms. There is, notwithstanding, one circumstance that seems as if it might impose upon us; I mean the simultaneous presence of a knee and an elbow. But besides the rarity of these coincidences, we learn, by penetrating a little further with the finger, that these parts, instead of approaching towards each other at their origins, separate farther and farther.

3. Presentations of the *breech* have, more frequently than others, led into error on this subject; where the buttocks have had some difficulty in getting through the os uteri or the strait, they swell like the vertex; the crease that separates them may be mistaken for the sagittal suture; the coccyx and space in front or on the side of it, for the occipital angle, the posterior fontanelle, and lambdoidal suture; and lastly, the ischia may be mistaken for the parietal protuberances; but this same crease, being a slit and not a fold, the movableness of the coccyx, the presence of the anus and of the genital parts, the roots of the members, &c., soon bring the accoucheur back to the knowledge of the truth, when he has departed from it for an instant. The anus and genital parts may be mistaken for a face presentation, were we not to remark that the mouth, bordered with thick lips, contains a conoidal, movable, and fleshy body, the tongue, and that the finger, when withdrawn from the rectum, is found to be covered with meconium.

Still, another circumstance might deceive us. I shall give the particulars, because the authors have omitted to mention them. Having been called upon by Madame Lebrun, the midwife, to terminate a preternatural labor, I thought I could feel the feet, the buttocks, the coccyx, and anus; but my finger penetrated into an opening, bordered by thick lips, at the bottom of which I felt a tubercle similar to the tongue. Disconcerted by this combination of signs, I for a moment thought I had to deal with a monstrous child; I again introduced my hand further; I brought down the feet, and the emergence of the hips soon put an end to my uncertainty. It was the vagina that I had mistaken for the mouth, and the cervix uteri, which is very salient at that age, had made me suppose I felt the tongue. In order to obviate all hesitation in such a case, it is merely requisite to remember that the mouth is open behind, so as to be continuous with the pharynx; whereas the vagina ends in a cul-de-sac, at the bottom of which the

os tincæ is to be found, in the shape of a tubercle, more rounded, shorter, and particularly, less movable than the tongue.

D. *External Examination.*—*Abdominal exploration*, which is so useful in diagnosing pregnancy, can also be of great assistance in recognizing the position during labor. It is the same case with the movements of the fœtus experienced by the woman. In all presentations of the vertex, the hypogastrium appears somewhat narrow towards the circumference of the strait, and the fundus of the uterus presents several inequalities more or less easily displaced. The absence of a projecting lump in front, or a little on one side, indicates the dorsal surface of the fœtus and occipito-anterior positions. If the inequalities of the fundus of the matrix and the movements of the child are felt on the right side, we may infer the first position. In the second, it is found, on the contrary, on the left. It would be the same in the fourth and the fifth, because the head only is in that case turned backwards, whilst the back has scarcely at all changed its relation, which even explains, partially, why the occiput is so often brought in front to clear the inferior straits. When the back of the child is situated posteriorly, the hypogastrium gives the sensation of numerous projections across the womb, and the movements appear to be more superficial and to take place lower down than in the anterior positions. We should suspect a position of the face, if to the preceding signs there be added the idea of a hard and regular rounded tumor, lying on the edge of the pelvis.

In the positions of the pelvis the woman often complains that she does not feel the movements of the child, or if she does, that they are very low down. It is easy to recognize the head near the umbilicus by its size, its rotundity, and its regularity.

The transverse positions of the lower extremities may be distinguished by the flattening of the abdomen along the median line, by the projections or inequalities which occur in the hypogastrium on either side, and by the movements which are felt very low down to the left or right, rather than above and in the centre.

§ 3. OF THE PROGNOSIS.

After having established the diagnosis, a new question naturally presents itself to the mind of the accoucheur, while it is very soon propounded to him also by the patient herself or her attendants. Will the delivery be prompt and easy, or slow and difficult? When will it take place? The answer here is an extremely delicate matter, and ought only to be given after maturely weighing it, and then, with the greatest reserve. The duration of labor is so variable, depends upon circumstances so diverse, and sometimes so unexpected, that it is often impossible for the most skillful practitioner to fix it beforehand, even approximatively. On the one hand, it would be necessary from the very beginning to know the proportions of the fœtus and pelvis, with how much energy the womb shall contract, and how often the pains shall succeed each other; on the other, he ought to be able to affirm that the progress of the labor shall or shall not be interfered with by a hemorrhage, an attack of convulsions, a prolapse of the cord, or some other accident; that the fairest and best position shall not be converted to an abnormal one; that the membranes shall give way at such a particular period, and not at any other; that there shall or shall not occur a spasmodic resistance of the cervix, &c. Now, none but ignorant women or impudent quacks can pronounce upon all these points, and, in spite of so many uncertainties, say at what hour the labor is to terminate.

All that we are permitted to promise in a general way is the following: the child is well situated; the pelvis is neither small nor deformed; the genital organs are healthy and well disposed; the os uteri soft and very dilatable; the pains occur regularly and with constantly increasing force; the woman

is courageous and well constituted; therefore the termination of the labor will be prompt and fortunate; a little less prompt if it be a first labor; a little more so, if she have had several children before, and still more so, even too rapid, if the pelvis be possessed of excessive amplitude. On the other hand, the position of the fœtus, without being positively bad, is not, however, one of the best, or perhaps it may be a very large one; the pelvis is slightly contracted; its axes are too much or not sufficiently inclined; the os uteri is hard, or covered with cicatrices; the woman is of a delicate, nervous, or lymphatic constitution; in all these, we ought to fear that the labor may become a long one, and that the resources of art may become necessary. We can also, to a certain extent, judge of the duration of the present labor by her former ones, and particularly by the effect produced by each pain upon the dilatation of the os uteri, and upon the progress of the fœtus through the pelvis. In fine, when all the phenomena occur in their most common order, we may, by calculating the time that has elapsed since the first pains, tell, within a few hours, how long the woman has still to suffer. If, for example, only two or three hours were required to bring the dilatation of the os uteri to the size of a five franc piece, it is extremely probable that not more than that will be necessary to complete the expulsion of the child; but this is the highest degree of precision to which we can pretend; and those who pique themselves upon the possession of more exact knowledge in this matter, either impose on the public or deceive themselves.

In fact, who has not remarked, with De la Motte, that labors which begin best sometimes terminate worst, and *vice versa*? A woman whose first labors have been fortunate may, in subsequent ones, meet with difficulty. The same author mentions the case of a lady in whom the eleventh labor was attended with difficulty, although the child was not larger than the others. Another died in the thirteenth, although the fœtus was in a favorable position. A lady, whom I attended, died of rupture of the womb in her seventh confinement. Youth is not always a disadvantage. De la Motte mentions a young person who was safely delivered before she was thirteen. The same thing may occur at an advanced age. We find in the records of a surgeon of Valogne, instances of women, pregnant for the first time at forty-eight and fifty years of age, and who were delivered without accident. If it be true, as Denman believes, that decided blondes and brunettes be more liable than others to laborious confinements, it is equally so that we often observe the contrary. On the other hand, the most speedy labors are not necessarily the best. Hippocrates has remarked that parturition without pain is usually dangerous, and Van Swieten urges the same observation. It does not follow, however, that labor may not be at the same time rapid and fortunate. A lady, who has already had five children, has such speedy labors, that, with all possible haste, the fœtus is usually delivered when I arrive. In all, her labors do not last more than from half an hour to an hour. Thus far she has met with no accident.

The accoucheur who, for the purpose of making a parade of vain knowledge, thinks himself able to announce the precise term of delivery, not only exhibits his own ignorance or bad faith, but he also compromises the dignity of his profession and the safety of the woman. If, indeed, it be true that chance is often on the side of impudence and quackery, it often happens that the predictions of ignorance or rash vanity are not realized; but if promises, generally made with much emphasis and assurance, are not fulfilled at the appointed time, that alone is enough to give rise to the liveliest solicitude, in the minds of relations or assistants, and especially in the patient herself, who never fails, afterwards, to think either that her destruction is certain, or that she is to have a bad labor.

ART. IV.—OF THE ATTENTIONS DURING LABOR.

Inasmuch as spontaneous parturition is a natural function and not a disease, are we thence to conclude that the art of the accoucheur is unnecessary, and that women in labor have no need of assistance? Some physicians, misled by mistaken philanthropy, have thought so. In animals, say they, pregnancy brings no inconveniences, and delivery is almost unattended with pain. The wives of the Ostiacks, who are still strangers to the refinements of European civilization, are delivered of their children upon the spot where they happen to be, and immediately resume their accustomed occupations, or continue their march, if they happen to be on a journey. Those of the island of Amboyna, who live under a directly opposite temperature, behave in the same way. The aborigines of certain countries in America bathe themselves in cold water and return to their work as soon as the child is born, while the husband goes to bed and plays the patient for a week or two! Parturition is a mere nothing to country-women, who cannot spare time to drag themselves, methodically, from the bed to the sofa, and *vice versa*. Who has not seen soldiers' wives bring the most robust and finest children into the world, without in any respect deviating from their active modes of living, or without ceasing by forced marches to follow their regiments? Even in the large cities it is not uncommon for poor women to go on foot to a midwife while the pains are upon them, and return home the next day in spite of hygiene, their poverty not allowing them to attend to themselves for more than three or four days. I, like Roussel, have seen a young girl who found means to conceal from her parents both the humiliating proofs of her weakness and the operation that delivered her from it. What practitioner is there who has not had an opportunity of making the same observation? The pregnancies of these poor creatures being illegitimate, it would seem as if they had no right to be sick. But these remarks in no wise prove that women ought to be left to themselves during parturition. In the first place, it is false to say that parturition in animals never requires any assistance, and is never accompanied with serious accidents; sows, mares, cows, &c., are even, in general, quite ill in bringing forth their young, and country people are by no means ignorant of the fact. Does it follow, because some women, when compelled by imperious motives to deliver themselves in private, or without taking the least precaution, escape from the serious dangers with which they supposed themselves to be threatened, that all others may imitate them without exposure to more imminent perils? If there are some whose health is not disturbed by such painful experiments, how many others are there who become the victims of their temerity? The business of the accoucheur, doubtless, is not to put himself in nature's place where a labor is natural; but somebody ought to be with the woman, who is able to give her proper directions, to foresee accidents, to recognize them, and to remedy them when they do take place. It is then incorrect, as has been well shown by Clement, that spontaneous delivery calls for no assistance. The attentions necessary in that case vary, moreover, according to whether it be natural, easy, and regular, or complicated with slight accident, painful or irregular.

§ 1. ATTENTIONS TO THE WOMAN.

A. *Hygienic treatment*.—1. The chamber and everything connected with it should be first attended to. In great cities, a back room should be preferred, or the quietest and best-aired apartment of the establishment. It is important that this chamber should be sufficiently spacious, well lighted, and so constructed that its temperature may be easily altered. Too great a degree of heat would promote sweats, cerebral congestions, convulsions, nausea, and vomitings, to which women are already but too much predisposed during the efforts of labor;

cold would not be less injurious, both by the disagreeable sensations it would be sure to excite, and especially by hindering the expansive movements of the fluids.

2. *Odors*, even the sweetest, are also not without inconveniences. During labor the nervous irritability of the woman is generally of the highest grade, and the senses become excessively excitable. The most valuable perfumes are sometimes borne no better than the most disagreeable odors. It would not, for example, be always safe to place a woman in labor in an apartment filled with the emanations of musk, amber, lilies, orange flowers, or roses. I have seen a lady fall down insensible and with convulsions, upon entering a room containing a pot of mignonette. I am acquainted with another who, without being pregnant, is seized with syncope or lipothymia whenever a fresh rose is brought near her. De la Motte instances a lady who was very disagreeably affected by a bunch of flowers held by one of her friends. A grain of musk in a wardrobe had the same effect on another.

3. The *regimen* of the patient requires the most careful superintendence of the accoucheur; indiscretions in respect to it may give rise to the worst consequences. In regard to this point, attention must be paid to the probable duration of her sufferings, to her constitution, and habits: if the delivery may be expected to take place within from four to six hours at farthest, all kinds of aliment are hurtful, by loading the stomach, the digestive power of which is temporarily suspended. If, on the contrary, the labor progresses slowly, she may have broths or some light kind of pottage; but she ought to refuse coffee and chocolate, usually preferred by women in large cities, as well as bread, fruits, vegetables, and meats of every description, which are best liked by country people; coffee has too much influence upon the innervation and circulation, and chocolate, bread, and meats are too difficult of digestion to be given without some fear in these circumstances. All this, however, ought to be understood only in a general way; a woman who is healthy, but feeble rather than strong, whose digestive organs are in a good condition, may, without inconvenience, and sometimes even with advantage, take a breakfast of coffee or chocolate, at the commencement of her labor, especially if she has been long in the habit of using them, just as we see stout, vigorous country women, as well as robust women of the laboring classes, eat one or several cutlets without being at all incommoded by them. It ought to be known that these exceptions are numerous, for by proscribing food in all cases indiscriminately, we just favor the evil we wish to avoid; no matter how absolute the threats of the accoucheur, it is not uncommon for them to be disregarded, and if no bad consequences follow, the woman, emboldened by impunity, no longer submits to advice, relates her story to her acquaintances, and as all beings are not less alike in their liability to illness than in shape, the punishment of her indocility fails not to fall upon some of those who have had the imprudence to listen to her.

I was called to a woman in her first confinement, in the month of March, 1824; this lady's mother had had thirteen children; she had never omitted to drink a bottle of wine and eat one or two cutlets during or immediately after her travail; in spite of my remonstrances the daughter must follow her example, but the unfortunate lady expiated her mother's imprudence with her own life! We must therefore allow to some what we would rigorously refuse to the far greater number, and be content with laying before the most obstinate the dangerous risk they run, and then leave them at liberty to do as they like.

4. *Drinks*.—Where the duration of a labor does not extend beyond the most ordinary limits, the woman herself is pretty often the first to perceive that she ought not to eat, that food would do her harm. This is not the case as to drinks; the excess of heat observed during the strong pains, has the effect of drying the organism, and loudly demands the introduction of fluids into the interior. Those

that may be allowed are innumerable; the infusions of mallows flowers, of marsh-mallow roots, of linden, of violets, of bugloss, and borage; decoctions of barley, of dandelion, liquorice, &c., either pure or edulcorated with syrup of sugar, gum or honey, capillaire, cherries, or marshmallows, may be given almost without distinction, as well as all imaginable ptisans, provided they do not exert any evident action upon the organism, and are not acid; for it is the water and not the medicaments that is here demanded by the organs. Lemonade and acidulated drinks would suit as well or even better than any other; but the stomach does not bear them well because they increase its tendency to acidity. Wine and water produce the same effect; the other ptisans often diminish the thirst very little, particularly if the woman does not like the decoctions of barley, dandelion, and liquorice, which are more refreshing, though they happen not to suit or be agreeable to her taste; if pure cool water is taken with more pleasure and satisfaction, I see no reason why it should be refused to her, taking care always to correct its crudity with a few drops of orange-flower water, or syrup of cherries, in very small quantity.

In the country, and among the lower classes, where the disembodied relics of old medical doctrines ordinarily take refuge, hot wine and *roties au vin sucré* are still given, with the view of sustaining her strength, and *eau de Carmes*, and a hundred other more or less heating compositions, to accelerate the labor whenever it appears somewhat tedious; but these incendiary measures, which inflame the already irritated organs, disturb all the functions, and sometimes excite fever, that no means are capable of allaying, and produce a dreadful hemorrhage, much more commonly than they do any good in hastening the delivery, are beginning to go out of fashion, and, let us hope, will before long cease to enjoy any favor. Madame Melville, a skillful and prudent midwife, was on the night between the 20th and 21st January, 1828, called to a poor woman, and though all the phenomena succeeded each other with the greatest regularity, all she could do was insufficient to prevent the administration of hot wine. A hemorrhage came on; new doses of wine were taken. The blood flowed still faster, and wine was again given to obviate the faintness. The child, nevertheless, was expelled, but a frightful discharge took place immediately afterwards.

It is only in cases of weakness or languor, depending upon old diseases, or the peculiar constitution of the woman, that it is occasionally found useful to give a few spoonfuls of good red or white wine.

5. The *state of the alvine and urinary excretions* will also require the attention of the practitioner. The constipation, which is so common during pregnancy, causes the rectum to remain inactive at the approach of labor; its contents may prevent the head from gliding downwards, irritate the sphincter and mucous membrane in the neighborhood of the anus, occasion too violent a straining, and promote the formation of hemorrhoids, which are naturally of too common occurrence in parturition. Guillemeau speaks of a woman who would never have been delivered, if she had not been relieved of hard masses distending the rectum, and Lauverjat reports a similar case. Consequently, provided the woman does not feel the necessity of going to the close stool, an injection of a decoction of marshmallow root or flaxseed, or simple tepid water, should be given. In some cases it becomes necessary even to have recourse to a spoon, a scoop, or a child's hand to withdraw the hardened matters.

6. Provided no *discharge of urine* takes place before the head becomes engaged in the superior strait, the emission becomes more and more difficult, in consequence of the compression which the *bas-fond* of the bladder soon suffers; it may, therefore, be supposed that, if the delivery is protracted, the retention of the urine may be followed by a painful distension of the bladder, and that the woman, who is restrained by the fear of increasing her pain, will cease to bear down, except very moderately. The action of the abdominal muscles, as it

can then be transmitted to the womb only through a stratum of fluid, ceases to be so efficacious, or if the woman gives herself up without reserve to the whole force of the exertions she is capable of making, there may be reason to fear a rupture of the bladder, a terrible accident, which is almost necessarily mortal. We find one case mentioned by Chapman, and another in the *American Journal of Med. Sciences*, for February, 1829, and Merriman speaks of a woman who died without being delivered, on account of a similar distension of the bladder.

The woman should therefore be advised to evacuate the bladder while she is still able to do so, and if the natural efforts are insufficient to effect the object, the catheter should be employed for that purpose. We are in such cases sometimes obliged, in consequence of the shortness and slight curve of the female catheter, to make use of a male one; but if we take care to push the fundus of the womb backwards with one hand, whilst we try to introduce the instrument with the other, I do not think that the flat catheter which is recommended by Kelly, Denman, Ramsbotham, and some of the English physicians, can ever be indispensably necessary. I do not see, moreover, that the gum-elastic bougie deserves here the preference given to it by Denman. The precaution that Denys was in the habit of taking, of placing the woman on her knees to introduce the sound, and then directing her to lie on her back, is seldom necessary.

7. The period of labor is, without contradiction, one in which the *moral state* of women demands the greatest attention; consequently, we ought, with all possible care, to abstract whatever may be disagreeable to them, or likely to vex them, and to respect even their caprices and the oddities of their characters.

None should be permitted to remain in the room except those persons who are indispensably necessary; that is, one, or at most two friends, the nurse and accoucheur. More than these would render the air impure. Some could not bear the spectacle of suffering without reflecting the impress of it from their countenances. Others could not keep their tongues still, would always have a supply of stories of dreadful cases, and a thousand imprudent things to say; at one while, that Mrs. such-a-one was delivered of a monster, or neighbor such-a-one died of convulsions; at another, they delivered Mrs. so-and-so with *instruments*, &c.; from tenderness, or real interest, or affectation, they grow quite sad, and lament over the possible consequences of the lying-in; and whisper or talk in a low tone, or at least they sit gloomy and silent, and merely throw a furtive glance of pity towards the woman in labor, who, as she is almost always disposed to make an evil interpretation of all that is said and done about her, every moment looks for her sentence of death in remarks only half heard, in gestures or in the expression of sadness and compassion she observes in her attendants.

Parturition is a function that seeks the shade, that may be obstructed by indiscreet looks, and which as far as possible is made a mystery of by modest women. The accoucheur ought to understand that the mother, the aunt, grandmother, or sister, is not always considered as the most agreeable attendant in this painful moment. As a discreet as well as a circumspect and prudent interpreter, he ought to dismiss without distinction every one whose presence is not desired by the woman. How careful should he be himself! impassible and firm, of an imperturbable coolness, he must, notwithstanding, know how to compassionate the distress of which he is a witness, encourage, console, amuse; inspire her with boundless confidence and great familiarity, by the affability of his conduct, by reasoning that everybody can understand, by his patience, the amenity of his temper, and the gravity of his manners; he should be able to procure obedience without constraint, and by all the means which are suggested by moral philosophy, his own understanding and education, incessantly combat the discouragement and dread of all sorts, and the sadness and alarms to which the most resolute as well as the most timid women sometimes give way.

8. The *dress* of a woman in labor was formerly a matter of great consequence;

there were gowns, jackets, and head-dresses devoted to this purpose alone; every country, each province, and even each family, had its peculiar fashion; a woman of good family would think she could not lie-in decently without her gown and other lying-in clothes; at present, these old customs are no longer to be found, except in a few countries or families, where, out of a mistaken feeling of respect, people obstinately resolve not to live differently from the mode adopted by their ancestors. To this the accoucheur has nothing to say, provided the form of the dress and its arrangement are not of a nature to interfere with the free exercise of any of the functions, provided there be no constriction of the abdomen, the breast, or the neck, that the motions of the limbs are left free, that the materials are light, neither too hot nor cold, and that the circulation does not suffer from their employment.

B. *Of the bed.*—1. The *bed for child-birth*, which is also called *lying-in bed*, *bed of labor*, *bed of pain*, *bed of misery*, *little bed*, &c., is also a matter of fashion, or custom, which has singularly varied as to its form, according to times, places, and whims. There are some women who will not make use of them, and who are delivered standing up, the elbows resting on a mantel-piece, the back of a chair, a table, a bureau, or some other piece of furniture, or even leaning on the shoulder of some friend. Some women place themselves on their knees upon the floor; others place themselves on their husband's knees, with their legs much bent and elevated. The ancients made use of a peculiar kind of seat or elbow chair, a *lying-in chair*, having supports for the arms, a movable back-piece, with notches in a piece to keep it at different degrees of elevation, a support for the feet, and a pierced seat; so as to be converted at will either into a real bed, or an arm-chair. These chairs, still made use of in Germany and Switzerland, and very good drawings of which may be seen in the works of Rhodion, Deventer, and Dionis, who blames Mauriceau for rejecting them, and of Stein and M. Hermann, are no longer employed in France, notwithstanding M. Rouget has lately attempted to revive them by presenting to the Academy, and to the administration of the hospitals of Paris, a new lying-in bed of his own invention. M. Touchard has also renewed the proposition since, and with as little success. M. Ehlère in Germany, and M. Bigeschi in Italy, have also invented others, which appear to me to deserve the same fate as their predecessors. They are not wholly destitute of advantages, but, as they can without inconvenience be replaced anywhere by other means more common, and always at hand, no person feels the necessity of resorting to them; and it would be too ridiculous to see a surgeon, as in former times, always followed by his lying-in bed, when proceeding to visit a woman in labor.

The best bed is one with a *sacking-bottom*, tight, of a middling size, and so placed that the upper end may rest against one of the walls of the chamber, and leave room to pass conveniently all around the rest of the bed; one mattress is laid on this sacking-bottom, and a second one, bent double in the middle, is arranged upon it in such a way that the edge of one of its extremities may support the buttocks, while its folded portions supports the back and head; a piece of cloth, some oil-cloth or some cushions, pillows, and bolsters, to supply an inclined plane for the head and breast, complete the preparations.

We may also be content with a cushion, to be slid under the middle of the first mattress, so as to raise the pelvis up and leave the perineum naked; the head of the bed is then formed with one or two common chairs, turned downwards, with the legs against the wall, and the upper edge of their backs towards the woman's breech; the rest of the arrangement is completed as before, and the second mattress is not wanted.

A single mattress, without any cushion, will also answer; it is to be doubled; the head of it is to be raised with chairs; all that portion of the sacking-bottom that is to be in front of the pelvis is left uncovered, and by means of some cloths to

receive the discharges upon, we may avoid soiling any part of the bed-clothes. Some persons add a stick, fixed crosswise to rest the feet against during the expulsive pains; but this fixture is more troublesome, than useful; the hands of an experienced nurse answer much better, for they can follow the different degrees of flexion and extension of the limbs. In the country a bed is often made by placing six or eight chairs face to face, and laying a mattress upon them.

Indeed, a strong and well-formed woman may be delivered in any posture, on a chair, on the floor, a bundle of straw, on foot, and on all the kinds of beds that have been proposed; so that it is only in the cases where nothing interferes with the accoucheur's prescribing just what he thinks best, that he ought to attach some value to the composition of the lying-in bed; further, the only essential matter is that the woman should be as comfortable as possible, that she be not incommoded neither during the pains nor the intervals between them, and that the perineum may have room to dilate.

2. There is not, neither can there be, any *fixed period at which all women should place themselves on the lying-in bed*. Some women feel the necessity of going to bed as soon as their pains get to be pretty strong; others not until a much later period; and most women may be guided in this matter by what agrees best with their own particular feelings. As long as they keep on the bed, or on foot either, because they are more comfortable in either case respectively, and not for the sake of gratifying some preconceived notion, they ought to be indulged; it would be absurd to compel them to remain on the bed from the beginning to the end of a labor, while the only means of alleviating their distress consists in moving about from place to place: on the other hand, by compelling them to keep up till the close of the labor, their courage and strength are exhausted to no purpose; they are exposed to the danger of bringing on flooding, to the prolapsion and overturning of the womb, laceration of the perineum, and to the too prompt and precipitate escape of the fœtus.

Those who bear children without pain, and rapidly, cannot too soon go to bed. If they delay, the child may fall on the ground, as in one of the instances related by De la Motte, and various accidents then arise. The fact should be remembered, also, that some women bring forth in one pain. Some are known to suffer no pain at all. Duchateau d'Arras speaks of one who, having gone to the privy, did not know that she had brought forth, until she heard the cries of the child in the sink; but it has not been demonstrated that there is not some error in these observations. The inertia is not partial, then, as Burns believes, nor general, as is thought by Ingleby. The womb contracts, and is no more relaxed than in any other labor; but the contractions are so regular, and meet so little obstacle, that they cause scarcely any suffering, explaining to a certain extent how Power and Dewees have been led to say that labor naturally is unaccompanied by pain.

Therefore, in regular labors, where there is no special indication to be fulfilled, it is useless for the woman to lie down previously to the rupture of the membranes, unless it be for the purpose of resting when she feels fatigued. When, on the contrary, the dilatation of the os uteri is complete, and especially when the head has descended into the excavation, it is better, but not always indispensably necessary, for her to lie down on the bed in readiness for her. Where the pains are weak and far apart, and where the membranes give way early, or the head remains very high above the superior strait, and the os uteri, although soft and very dilatable, opens with difficulty, she ought to keep up and move about as long as her strength will permit. Again, she should be persuaded to lie down early if her pelvis be a very large one, and the membranes do not give way, though the os uteri be dilated, when the labor progresses too rapidly, and when there is a threatening prospect of hemorrhage, or when there is an obliquity of the womb. Women affected with curvature of the spine, asthma, hydrothorax,

ascites, or some other abnormal disposition, are sometimes constrained not to lie down at all, and are obliged to be delivered while standing up, or seated, or on their knees, &c., while there are others who could not leave their beds before the termination of the labor without difficulty. But these are cases of exceptions which do not belong to the class of eutocia.

When the woman is on the bed, she should, during the pains, be on her back with the legs and thighs half flexed, and the feet resting on the mattress or sacking. This posture, which is so natural that women assume it of their own accord, and if they have changed it for a moment, always return to it as soon as the pain returns, is particularly necessary where the womb is strongly inclined forwards. But in the intervals of the contractions, it would be as ridiculous as it would be cruel to exact any determinate attitude; the woman ought then to be left free to choose a position that is most agreeable to herself, on either side. A being, when suffering unavoidable pain, at least hopes, by changing its situation and trying various positions, for some alleviation of its distress; to deprive it of such a resource would be a real act of barbarity. Moreover, the attitude on the back is very rarely necessary except in cases of very decided obliquity. Most of the English and American women lie on the left side, with the breech near the right edge of their common bed, which is properly prepared, the legs and thighs flexed, the knees separated by pillows or cushions; and, notwithstanding, we do not find that child-birth is much more dangerous in England than in France. The position of the woman on her back, during labor, for a long time adopted by the German accoucheurs only, has given way, according to M. Kilian, to the lateral position preferred by Boër, Schmidt, Wigand, and Nægele. However, it is evident that such an attitude must be very uncomfortable, and unfavorable to the muscular contractions that occur during the pains. The British accoucheurs, who recommend it, think it admits of their supporting the perineum more effectually, of employing the touch more freely, and, which I cannot understand, of operating more readily with the forceps, the hand, or any instrument whatever; but when we remember to what extent the modesty of the English ladies is carried, and reflect on their extreme delicacy, and the reserved character of their manners and customs, we are rather led to think that the lateral position, which prevents them from looking the accoucheur in the face, has been chosen to gratify and save them from unpleasant feelings. Many writers of that nation, and Smellie in particular, agree that the French method, adopted also by Dewees, is more convenient. Ritgen, who wishes the woman to lie on her side towards the termination, is careful to remark that his object then is only to neutralize muscular co-operation, which he fears, I scarcely know for what reason. Denman himself says that the position on the side facilitates laceration of the perineum. Peu confesses, withal, that he was compelled to make one woman lie on her belly.

C. Position of the Accoucheur.—The accoucheur places himself to the right of the bed; he is there most commodiously situated to touch, to follow the progress of the labor, and support the perineum: all of which may be done under the bedclothes, for it is with the finger or hand, and not with the eye, that he must here act and ascertain the state of the parts. Desforbes, one of the most skillful accoucheurs of his day, according to Dionis, was blind.

As the will and the courage of the patient exert a great influence on the progress of parturition, it is necessary to know how to direct their powers. We daily meet, in practice, with women who *bear down*, and endeavor to make the most of their pains as soon as they become somewhat strong; the old woman, the midwife, and sometimes the accoucheur himself encourage them to act in this way, by persuading them that they will be the sooner delivered. Such conduct is extremely blamable, and can only be the fruit of ignorance or want of reflection. Where the os uteri is not dilated, the membranes unbroken, or at

least where the head is not as yet engaged in the superior strait, efforts to hasten the delivery only serve to exhaust the woman to no purpose whatever; until the end of the first stage, the action of the muscles is not solicited, the womb does not demand their aid, and they can be of no use.

But as soon as the fœtus penetrates into the excavation, the os uteri being dilated, and the membranes ruptured, and the sense of weight about the *fundament*, tenesmus, and strainings are felt, they occasion a desire to *bear down*, and compel the muscular contractions to come on stronger and stronger in aid of the womb, in proportion as the child is nearer the moment of expulsion. The womb now compels the efforts to take place, independently of the woman's will. The thing is, to know how to make the best use of them; and there are many women who do not know how to do it—who do not know how to deliver themselves; who, with the expense of a considerable degree of power, cause the labor to advance but very little. The accoucheur should teach them their apprenticeship, if I may use such an expression; should teach them that, when the pains are regular, they should not employ their voluntary efforts until the contraction is fairly begun, or until the muscular action is positively solicited; then, by pressing the pelvis, feet, and hands upon the bed, or upon the persons stationed to support them, they should bear down with all their might, as if at the stool. As soon as the womb itself ceases to act, all effort ought to be suspended, and the woman should be strictly directed to rest, and be as still as possible, never losing sight of the fact that the muscles are not intended to force the fœtus downwards, but only to aid and support the contractions of the uterus.

The pains are sometimes so acute, so intolerable, when the head reaches the inferior strait, that, instead of bearing strongly on the pelvis, and pushing downwards, the woman, in spite of herself, draws upwards as if to avoid the pain. In this she is doubly disappointed; in the first place, because nothing can save her from the distress she endures, and because she in this way voluntarily protracts the period of her deliverance; and then, far from being an evil, violent contractions are what she should above all things desire, for upon them depends the prompt termination of the labor. The same thing often takes place in women who are too pusillanimous, too nervous or timid; they are restrained by the fear of making the pains too sharp: they are restless, and toss about from place to place, and rather than assist and make the most of their pains, do all they can to hinder or suspend them.

Some of them fall into the opposite kind of excesses, give themselves up to such immoderate efforts, that, unless care were taken, very serious consequences might ensue, such as a great congestion of the brain, and even an apoplexy, the sudden swelling of the thyroid body, and the rupture of the large veins of the throat, the formation of hernias of all sorts, temporary paralysis of the lower limbs, &c. The dangers to which they expose themselves by inconsiderately bearing down in this manner ought to be painted in strong colors, and exhibited to their view, and all the means of persuasion and control should be skillfully employed in order to oblige them not to give way so completely to their feelings. If reason, entreaty, and gentleness do not succeed, a firm and even menacing tone, properly adapted, sometimes becomes necessary. There are a thousand means to be made use of to quiet them, to inspire them with dread, and restrain them. Thus, Baudeloque, after having in vain exhausted all his resources, thought of bringing two lawyers dressed in their robes into the chamber of a woman in labor, by which she was so intimidated, that she thenceforth became reasonable, and submitted to the counsels of her accoucheur. We see then that, in imitating *La Cuisse*, who, if we may believe *Mauriceau*, went to sleep during the labor near the woman, and did not awake until the passage of the child, the accoucheur would fulfil only a part of his duty.

D. *The Touch*.—The touch is performed at different periods of labor, for the

purpose of ascertaining the position of the fœtus, the degree of dilatation of the neck, and to learn how far the head has descended. Rigorously speaking, it would be sufficient to touch three times during a labor: once at the commencement, to learn certainly whether the womb is contracting, contrary to Deleurye, who fears that the membranes may thus be ruptured; a second time, just as the waters break, to make ourselves positively sure of the position; and a third, when the pains and efforts have acquired a certain degree of strength, in order to see whether the parts engage properly in the excavation; but, generally speaking, unless the vulva and vagina are very sensitive and irritable, we may repeat this operation much more frequently, and that without any ill effect.

Provided the touch were never practiced but for the purpose of learning the progress of labor, it would rarely be followed by any other inconvenience than that of annoying the woman and wounding her scruples, how often soever it might be repeated, always excepting the cases where it is made an object of study, as in our public halls, where a very great number of students touch the same woman in succession. But there are accoucheurs who resort to it with very different motives, who, furnished with an apron, the coat off and shirt sleeves tucked up, seat themselves betwixt the woman's knees, and perform what they call her *lesser labor*, and forcibly dilate the vulva and os uteri under the pretext of accelerating the progress of the case. Deventer is one of those who have contributed most to extend this practice. The whole hand, says he, should be introduced into the vagina, as soon as the head enters the excavation, in order to push back with force the *coccyx* and the *point of the sacrum*. Mesnard believes, also, that we really aid the woman by depressing the coccyx, and A. Leroy has not disdained to countenance the opinion of Deventer. It is a method, moreover, which appears to be of ancient date, for both S. Pineau and Lemoine have endeavored to demonstrate its inutility. We can imagine that the point of the sacrum in such cases has been mentioned only from want of reflection, and that it would be ridiculous to undertake to depress it. As to the coccyx, as it forms one body with the sciatic ligaments and the perineum, it will be pushed back more advantageously by the head or body of the child, than by the hand of the accoucheur. A woman in whom it was unyielding, more than forty years of age, spoken of by Smellie, had, nevertheless, no difficulty in labor.

If it be sometimes useful or even permissible to introduce one or more fingers into the vagina, so as to aid in the dilatation of the parts, it is only in cases where rigidity or an irritated condition of some point in the vulvo-uterine canal indicates that it would be well to introduce some mucilage or soothing ointment, such as Galen's cerate, or the cucumber ointment, and not oil, as recommended by Consell. It is not, however, dangerous to introduce the hand into the vulva. It would be even wrong to omit doing so, if there were doubts as to the proper conformation of the pelvis or the position of the fœtus, when it is important to be assured as to the state of the parts under this double point of view. I will add, that, when in the vagina, the hand produces impressions which stimulate in a very happy manner the muscular efforts of the woman, as well as the contractions of the womb.

When the head, in engaging in the strait, and even in passing through the excavation, pushes the cervix before it like a cap, there may be some use in supporting the circle with the end of one or more fingers during the pain; but if it is not always dangerous, it is at least always useless to try to overcome its resistance by artificial means. It would be at least very bad practice to place the whole hand in the vagina, to support the neck as soon as the bag of waters is broken, as Burton directs.

E. *To support the perineum.*—When we reflect on the form of the pelvis and the direction of its axes, it is easy to perceive that the perineum, which is a continuation of the sacro-coccygeal wall of the pelvis, but much less solid, must be

violently distended, and run the greatest risk of being torn, as the head emerges from the lower strait. Hence all accoucheurs have recommended some mode of preventing this accident from taking place. Some have supposed, with Mesnard, that it is only necessary to push the coccyx backwards, or to place two fingers between the head and perineum when the occiput reaches the vulva; others that the object may be better attained with the assistance of Roonhuysen's lever, or a wide piece of whalebone; lastly, some practitioners are content with the application of the hand to the exterior. But inasmuch as, in spite of all these precautions, the perineum sometimes tears, certain modern surgeons have concluded that it is wholly useless to support it in any way.

To support the perineum, says Pinel Grand-Champ, is not only useless, but even injurious. Mende, successor to Osiander, at Gottingen, was so convinced of the fact, that he has not hesitated to announce it publicly in Germany. Schmitt maintains that nothing can prevent rupture of the perineum in primiparas. If I may believe several young English physicians, the accoucheur who had charge of the Lying-in Hospital at Dublin, in 1824, is of the same opinion; and Siebold, who was opposed to the opinion from his long experience, has not prevented Ritgen from declaring that there is no other means of preventing laceration of the perineum than to place the woman on her side at the moment the head clears the vulva. If it be proved, says Kilian, that ruptures of the perineum are not more frequent when it is not supported, it is no less true that those which then occur are greater in extent. Kilian remarks, besides, and with justice, that we must not confound with laceration of the perineum, fissures of that region, which take place at the moment of greatest tension, which cannot be avoided, and in the production of which the muscles take no share. As here, success depends less on the means than on the hand which employs them, it is probable that for a long time there will be diversity of opinion as to the value of those proposed.

Seeing that no method now in use is perfectly successful, some physicians in Germany have proposed to make an incision in the perineum from before backwards, rather than to allow it to be lacerated. This practice, that Mauriceau already blames, that Burton recommends, and that Weise thinks excellent, has, moreover, been defended by Michaelis, and by Leinweber in 1827. No doubt incision is to be preferred to laceration, if this last were absolutely inevitable; but as it is often prevented, and in the majority of cases but slight, I do not think Weise's advice should be followed, although I cannot agree with Kilian that the lacerated wound of a sound perineum will always heal as well as the clean cut made by the bistoury.

However this may be, the conduct recommended by reason and experience is the following: the hand, either naked, or, what is better, wrapped in a linen cloth, is applied transversely, so that its cubital edge may correspond to the point of the coccyx, and that its radial edge may be below the anterior commissure of the perineum, the ends of the fingers may lodge between the labium and the thigh, or extend on to the thigh, while the finger and thumb, being separated, are placed between the other labium and opposite thigh. In this way we convert the inclined plane that the head has to pass over, in emerging from the soft parts, into a firm wall; the hand is placed there as if to continue the concave surface of the sacrum and coccyx, and as if to compel the head to adapt itself to the axis of the vulva; the power that we employ must, therefore, act from behind forwards, from the coccyx towards the pudendum, and not in the opposite direction nor laterally. We must force the occiput to turn upwards towards the pubis, and not hinder it from descending; besides, it is only at the moment when the head begins to distend the vulva with a certain degree of force, that it imports us to act; previously to this period the operation would be without object, and the accoucheur would prove merely that he is ignorant of its mechanism.

By trying to bend the fingers a little, as has been recommended, for the purpose of bringing the soft parts towards the median line, the hand is rendered too concave, and does not support the head sufficiently, and we thus promote exactly what we wish to avoid; by placing the hand, as others recommend, in a state of supination, vertically, with the fingers towards the coccyx, and the wrist towards the vulva, we again miss the object, for our efforts are then directed with more facility in front than behind, while the contrary is what we wish to do. Finally, to prevent, as certainly as possible, any laceration from happening, we may, after the manner of M. Flamant, take hold of the skin on the buttocks or posterior part of the pelvis with both hands, and draw it forwards as much as possible. It is a practice that Puzos recommends, since he wishes us "to bring the surrounding parts together, and to draw the thighs near to the fundament, to thicken the part that is in danger." It is proper, it is even important, as soon as the parietal protuberances have passed the level of the tuberosities of the ischia, to engage the woman to moderate her efforts, instead of exciting her to bear down more and more, as is too commonly done. This is the moment that the parts, being surprised, or astonished, are lacerated, if the head, pressed too rapidly forwards, does not give them time to yield and mould themselves by it. Therefore, the slower the progress of the head, the greater will be the chance of preserving the perineum uninjured. It is the passage of the shoulders, and not of the head, says Kilian, that gives rise most frequently to laceration of the perineum. This author goes too far; but there is some truth in the assertion.

I am far from saying that laceration of the perineum is in all cases a serious accident: on the contrary, I believe it to be very rarely dangerous; but the accoucheur ought nevertheless to do all he can to prevent it from occurring; and I cannot too strongly condemn the negligence, in respect to it, of which most of them are culpable. If it be not in our power to prevent the woman from suffering, it is at least a duty to preserve the natural form of her organs as far as possible. The wound will heal up, no doubt; but the dimensions of the external orifice of the vagina remain too large. And we cannot divine what distress may be indirectly produced by this accident, though in appearance a slight one. Called upon to speak of this hereafter, I will say nothing more of it at present.

§ 2. ATTENTIONS TO THE CHILD.

A. *Positions of the head.*—1. *Occipito-anterior positions.* As soon as the head has passed out of the vulva, it should be supported by both hands; the fingers, being separated, are applied under the occiput, the ear, the lower jaw on each side, being careful not to prevent the act of restitution from taking place. Rigorously speaking, we might dispense with any tractive effort; for the remainder of the fœtus is often expelled with the same pain that delivers the head; or else another pain soon comes on to complete the delivery. However, as there is no advantage to be derived from retarding the termination of the labor, and the woman has nothing so much at heart as to be promptly delivered, it is best to follow up the impulsion given by the womb, and whilst it is still contracting, to draw very prudently and moderately upon the head or armpits, in the axis of the inferior strait. When uterine contraction ceases completely after the exit of the head, we must wait for another pain before making the slightest traction. Otherwise the uterus might be too rapidly emptied, and inertia of the organ produced. It must also be remembered that, if enough time has elapsed to allow the vulva to close on the neck, the posterior shoulder, pushed with force, or drawn out without care, may tear or deeply wound the perineum quite as readily as the head.

The conduct I have just above indicated is particularly applicable in the three true varieties of the occipito-anterior position. It may, and indeed ought to be slightly modified in most of the other presentations.

2. *Occipito-posterior positions*.—When the occiput looks towards the back part of the pelvis, delivery being in general more difficult, it is natural that we should profit by its tendency to turn forwards, in order that we may by degrees convert it into an anterior position, contrary to the advice of Kilian, who says the accoucheur should never attempt to change the position in the cases in which the posterior surface of the child is towards the sacrum. In this we may sometimes succeed by imitating the natural processes. When the head sinks into the excavation almost immediately after the evacuation of the waters, we endeavor to make it deviate to the right or left, in the intervals between the contractions, by passing two or three fingers up in front of the sacrum.

During the pain, we prevent the head from returning to its original position, by leaving the fingers, with which we displaced it, betwixt it and the median line. These attempts are repeated as often as they may be deemed necessary, and if we cannot always succeed in converting the fourth or fifth positions of Baudelocque into the first or second, we are at least sure that we occasion the mother and child both no additional hazard where the manœuvre is properly executed. The perineum is in more danger of being lacerated in this than any other position; in order to support it efficiently, we should take care not to incline the hand too much forwards, for the point of the head would fall almost perpendicularly upon it, and would rather turn backwards towards the anus than glide in the direction of the vulva. This is the situation in which M. Flamant's precept is especially applicable, if the integuments of the sacrum were not too adherent to allow themselves to be readily drawn towards the vulva.

3. *Face positions*.—Although the face positions do not render delivery much more difficult than those of the vertex, yet, as they are less exactly according to nature, it is always prudent, where it appears easy to do so, to change them into positions of the vertex. It can no longer be thought of after the head has once reached the excavation; it should be attempted while it is still movable at the superior strait, and that in two different ways: we may either try, with two fingers, to push the chin towards the breast by acting on the forehead, or we may endeavor to hook the occiput, to draw it down and produce the same effect. In both cases we leave the fingers in place until a contraction comes on, so as to transfer to the occipital branch of the lever represented by the head, the power that previously acted upon the facial or anterior branch of it. It would be particularly important to effect this conversion in the mento-sacral position, if it should ever be met with. Further, where the face emerges first, it is not so easy to support the perineum as it is in the vertex positions; but the rupture of the perineum is the less to be feared, because the front of the neck, and not the bregma, presses against the lower edge of the symphysis, while the upper oval of the head passes along the perineum to reach the vulva. The hand ought, therefore, to press but moderately, and not at all until the forehead is without; otherwise we might increase the danger to which the fœtus is exposed, or at least interfere with the termination of the labor.

4. When the whole *forehead*, or one side of it, the anterior *fontanelle*, one of the parietal protuberances, the upper part of the nucha, the chin, or one of the cheeks, is substituted for the frank vertex or face positions, they do not always prevent the delivery from being spontaneous, because the woman's efforts generally succeed in causing the occiput or face to descend. Nevertheless, as these intermediate or *bastard* positions may, to a certain extent, embarrass the progress of the pains, or of the labor in general, we ought, as soon as they are discovered, to attempt to change them to the regular positions to which they correspond. As long as the head continues at the superior strait, and the womb is not too strongly contracted upon the body of the child, we might hope, by introducing a couple of fingers behind, in front, or on the sides of the occiput, to bring it

back to the centre of the strait, or at least, if we could do no better, force it to enter fairly with the face in the opening.

B. *Presentations of the Pelvis.*—1. *Presentation of the feet.*—In maintaining that footling labors commonly terminate without assistance, I did not mean to have it inferred that we must never touch the fœtus in any way until it is completely expelled; but merely, that it is unnecessary, and even dangerous to exert any tractive force upon it.

As soon as the legs appear, they should be supported, after wrapping them in a napkin; the same is to be done with the hips, the arms, the breast, and shoulders. If the heels, the knees, or the elbows press against the floor of the pelvis, they are to be disengaged and drawn towards the vulva with the fingers. As they may perforate the perineum when arrested on its pelvic surface, they claim here all the attention of the practitioner. When only the head remains in the excavation, we place a couple of fingers on the chin, in the mouth, or, what is still better, on the sides of the nose; two or three fingers of the other hand are slid under the symphysis pubis, so as to support the occiput, and as soon as the least contraction comes on, we draw the whole downwards in the direction of the axes of the inferior strait and vulva, as if we were trying to turn the child's back up over the mons veneris, and upon the hypogastrium of the mother.

The head, now having nothing to pass through except the perineal strait, is beyond the influence of the uterus, and may be extracted without difficulty; but while ever it has not traversed the uterine orifice, or the abdominal opening of the pelvis, the least attempt to accelerate its escape could tend only to produce a case of real dystocia. As to the perineum, it is easily managed, since it depends upon the accoucheur to pull the head with more or less force, or to incline it more or less forwards, as it passes through the vulva.

2. *Presentation of the knees.*—The knees present very few peculiar indications; if they present in a regular position, they should be allowed to come down of themselves, and when they reach the vulva, all we have to do is to assist in disengaging the legs. If one of them assumes a bad direction, lodges against some part of the pelvis, or is arrested by the cervix or some fold in the vagina, it is commonly disengaged without difficulty, and brought alongside of the other. For the remainder, we are to act as in feet presentations, taking care not to pull unnecessarily.

3. *Presentation of the breech.*—When the buttocks descend first, and the feet tend to engage at the same time, it is sometimes well to push the latter back, and keep them somewhat raised during several pains; if not, there is nothing to be done until they get to the bottom of the excavation. It is, in this state, improper to pull at the breech except during the contractions of the womb; if, however, its size is very great, and there should be some difficulty in its passing through the vulva, the finger hooked into the groin that is towards the sacrum may be of some service by enabling us to give timely assistance to the woman's efforts. The hips are scarcely delivered before the constriction they had experienced is transferred to the child's belly. It is important, then, to pull on the thighs and legs, which should be extended in order to diminish this dangerous compression; the management of the rest of the labor is in all respects similar to that required where the feet or knees present. As the buttocks are escaping from the inferior strait, they sometimes distend the perineum as much as the head does when it comes first; but, as they are much softer, and the flexibility of the trunk admits of their accommodating themselves much more easily to the direction of the axes as well as to the forms of the spaces they are obliged to traverse, they much more rarely occasion a laceration; so that in such cases it is not always indispensably necessary to support the perineum.

4. In *oblique positions of the breech*, we must act as in the inclined posi-

tions of the head; we must endeavor to restore them to a correct state: if the posterior surface of the coccyx and point of the sacrum are in the centre, the woman should be directed to lie down early; she should be made to lie as much as possible on the back, while the hand, applied to the hypogastrium, pushes the womb backwards and upwards; if this precaution should not suffice, we might, with a couple of fingers of the other hand, hook the ischia and draw them down into the strait. If one of the buttocks engages alone, with or without the corresponding hip, it should be raised up during the absence of the pains, or we should try to reach it directly, by passing some of the fingers up along its external surface.

Where, instead of one buttock or the coccyx, we meet with the genital organs or forepart of the legs in the centre of the dilated os uteri, it is generally easy to bring the legs down in place of the breech; and this ought to be done whenever both the breech and feet present at the same time, for it would evidently be too difficult to compel the former to engage alone.

ART. V.—OF THE ATTENTIONS NECESSARY IN IRREGULAR OR PAINFUL LABORS.

Without positively demanding active and energetic assistance, labor is sometimes sufficiently tedious and fatiguing to inspire fear, and to induce us to modify its course. The causes which delay it thus, and which do not belong to *dystocia* properly so called, relate nearly always to the constitution of the woman, the state of congestion or debility, of excitement or spasm, of dryness or relaxation, of unequal contractions, or of inertia of the organs of generation, or else to the condition of the bag of waters—enough to forewarn us that the same means will not suit all cases, and that, on this account, there are no specifics in *tokology*.

§ 1. TARDINESS OF THE LABOR FROM DIFFERENT CAUSES.

In former times, every physician and every midwife had an *oxytocic* remedy, some sure means of bringing labor to a prompt termination; upon this head all the arcana and amulets have had their share of puffs. Some put a bit of precious stone, as jasper, topaz, emerald, &c., in a small bag, which was suspended from the woman's neck; others advised her to hold a piece of loadstone in the right hand; sometimes an eagle's plume was fastened to the thigh, or the first feather of the right wing of that bird was secured to the sole of her corresponding foot; sometimes, again, she was to have the belly rubbed with viper's fat and snake's gall, or the navel was covered with a very hot snake or rabbit skin; finally, some saffron placed on the hip, some cabalistic sentence on the forehead, the breast, or pit of the stomach, and a thousand other absurdities of the same kind, were also frequently made use of. It would be almost puerile to make the least mention of such nonsense, provided we were not obliged, from human respect, to reply to certain folks who hold them to be great secrets, and in certain cases to show, like Van Swieten, some condescension for the weakness of females. These remedies at least will do no mischief, and may, perhaps, prevent the administration of some less inoffensive application.

The aromatic waters, as balm and mint waters, the tinctures of canella, of cloves, all sorts of compounds, and all sorts of alcoholic elixirs, have each had their day, and many women who have used them have fallen victims to their imprudence. Purgatives and emetics have had great vogue even among medical men, and are not yet wholly forgotten by the vulgar. Lebas says that, if the woman has fever, is plethoric, that if the head presents, or if the child is dead, nothing is better than an emetic. Preparations of manna, or of senna, to which, by way of corrective, was added lemon or orange juice, were very much used in the time of Mauriceau; but, without denying that such preparations may possess the faculty of restoring the pains in some particular cases, and without fearing

their action on the alimentary canal, so much as some physicians of our day do, it is, notwithstanding, manifest, that, if they ever may become dangerous, it is chiefly to women in labor that they are likely to be so.

Purgative articles, given in the form of clysters, are not attended with the same disadvantages, and, in fact, they appear to have been employed in this way with some advantage: amongst others, the decoction of senna, whose operation is generally accompanied with smart colic, is, perhaps, not to be wholly neglected. It is at least certain that I have, at the *Maternité* of Tours, seen it impress upon the contractions an energy that could scarcely be attributed to mere chance.

Labor sometimes progresses with extreme slowness, and may last from two to five or even eight days, and of which De la Motte gives a case, without there being anything particular to be done, and that in two opposite cases: 1. In young nervous women at their first lying-in, and who are of a rigid and excitable fibre; 2. In those of a delicate, feeble, and lymphatic constitution, or where the os tincæ is very soft for some time before the full term.

In the former, the labor can with difficulty set in fairly, because the orifice is too resisting, or of too great a degree of sensibility; here a small bleeding, if warranted by the state of the pulse, and the strength and habitual coloration of the patient, a tepid bath, unctions with belladonna ointment, and slightly narcotic and soothing drinks, may sometimes be employed with advantage.

In the latter, it seems as if the womb were in a state of uncertainty, as if it were assaying its strength, as if under the necessity of preparing in silence before entering openly into action; I have seen some remain two, three, or four days in this state; but when the contractions once acquire a certain degree of energy, the labor terminates in general with an extreme rapidity, which singularly contrasts with its former slowness; indeed, it is to this circumstance that a crowd of remedies are indebted for the vogue they enjoy. Nature here has no need of assistance; this slowness is necessary for her, and it ought not to be disturbed in any way; we are merely permitted to support the strength by giving some analeptic aliments, or a few spoonfuls of wine, repeated from time to time, and always with the greatest reserve.

On other occasions, the pains, after having been regular and pretty smart, begin to return only at long intervals; sometimes this is owing to the general weakness of the woman or the fatigue of the womb; sometimes, on the contrary, it must be referred to ill-directed efforts of the womb, or to its not possessing a great share of excitability. In the former case, rest, and some broth, if there be any appetite, a little wine if there be not too much thirst and heat, and resignation, are all that we can recommend. In the latter, we also recommend rest, if the woman is much fatigued, but otherwise she should be advised to walk about; for it cannot be denied that walking about and a vertical posture positively accelerate the progress of labor. Without believing, with Bird, that the child loves its mother the more in proportion as the labor is painful, it must, nevertheless, be confessed that the most speedy accouchement is not always the best, and that we must not be alarmed at a certain slowness in labor. Pacoud mentions a woman whose labor lasted eight days, and who brought forth a living child.

Time and patience are here the great remedies; but this is a sad resource for one who is in a state of suffering, and the accoucheur must expect the most multiplied solicitations, and all sorts of proposals and entreaties from all the bystanders. When, for instance, it happens in the course of a long labor that gases escape from the womb, as in five cases referred to by Merriman, there is every reason to fear that the child is either dead or at the point of death.

As long as they are satisfied with amulets and inert topical applications, and do not insist on giving active substances internally, they should be allowed to say and do as they like; it is one way to amuse the women. While they see us

busy in regard to their sufferings, they bear them more courageously. Should the practitioner be compelled, for the sake of quiet, to prescribe some remedy, he should follow the advice of Mauriceau, and, in the first place, make a bargain with the patient, obtain from her as much time as possible, and promise her that, if at such an hour the pains do not return, he will then cause them to begin again: then, when the hour agreed upon arrives, if the pains continue to be still weak, take care that the article to be made use of cannot be procured except from some considerable distance; that the person sent to bring it be a dull messenger, who will be apt to lose his way; let it be some sort of wood, or bark, or root, or at least some hard substance. When the remedy at length arrives, it must be pulverized or rasped for a long time; after which, it should be boiled for several hours. In the next place, the liquid must have time to cool; it is next passed through a piece of linen, something more is to be added, and then it should be boiled over again; at last it is given to the patient, and as three or four hours are necessary for it to produce its effect, it is easy to see that we may in this way gain more than half a day, and that within that interval the pains will rarely fail to resume their natural course.

§ 2. IRREGULARITY OF THE PAINS AND OF THE CONTRACTIONS OF THE UTERUS.

A. *Pains in the loins*.—Nothing torments and annoys women, nor prolongs labor, more than pains in the loins. Aristotle has heretofore said that, if the pains are towards the loins, the accouchement becomes laborious, and all practitioners know how painful they sometimes render labor. Each one has given his own explanation. Their cause is still almost unknown. Mauriceau attributes them to the dragging of the uterine ligaments. Dionis says they are owing to the round ligaments alone. W. Kintish, on the contrary, ascribes them to the separation of the symphyses by the head of the child; whilst Millot refers them to the contraction of his pretended transverse muscle of the womb. None of these hypotheses will stand a serious examination. It appears to me that pains in the loins find their source in the summit of the womb particularly, and in the neighborhood of the neck; that they are explained by an excess of irritability or sensibility in these parts, and by the inequality of the contraction which must necessarily result. Women who experience them, turn and toss, and cannot remain in the same place. During the contraction, they refuse to bear down, and seem to do everything to restrain the action of the uterus, and of the abdominal muscles, which they dread excessively. Besides, it is in the first half of labor that they show themselves, and are most severe. They are more frequently observed in presentations of the pelvis, and in abnormal positions than in those of the vertex. When the neck is completely dilated, and the head presses strongly into the strait, they nearly always give way to more natural pains. The descent of the cranium into the excavation generally puts a stop to them.

Art possesses no efficacious means to arrest them. Bleeding, baths, narcotics, antispasmodics, internally or applied to the neck, as we shall have to discuss later, in general are far from soothing them, and should be employed only when called for by some special indication. It is patience and resignation that we must inspire in these cases. A cloth, folded like a cravat, or as a broad band, and passed under the loins, relieves the woman somewhat, instead of increasing the pain as St. Germain believes, if two persons, placed one on each side, hold it so as to relieve or give support during each pain. The same effect is produced by supporting the knees as a *point d'appui* with the hand, or with the forearm. Gentle pressure on the hypogastrium may also be tried with some cases; but, generally speaking, it is only the progress of the labor which can overcome the pains.

B. In certain cases, the labor becomes slow, because the *contractions* are *difficult*, extremely *painful*, *unequal*, or *partial*.

The first-mentioned case ordinarily depends upon plethora, either local or general, which is the cause why the uterine fibres, engorged with blood, and as it were stupefied, cannot contract with suitable energy. Women who are strong, robust, sanguine, and very muscular, are most liable to this state of things, which is known by a feeling of general uneasiness, weight, and distress felt in the hypogastrium and pelvis, a highly-colored skin, and especially by the pulse, which is either strong and full, or contracted, small, and hard; in this case, bleeding from the arm frequently succeeds in restoring to the pains all necessary activity.

The second case may be met with alone, or concurrently with the former; and as its cause is an exalted sensibility, whether natural or accidental, of the whole economy, or of the sexual organs in particular, it is proper, after bleeding, if that has been deemed useful, to have recourse to baths, to the mildest anodynes, and even to the thebaic preparations.

The third case is of much more frequent occurrence than the generality of practitioners suppose, and I can hardly comprehend why authors make scarcely any mention of it in the treatises put into the hands of students. The work of Wigand, which is highly esteemed in the north, proves that these contractions have fixed the attention of the German accoucheurs in a very special manner. Among us, hardly anybody but Madame Boivin speaks of it; but Burns and Dewees treat it somewhat more at length. Sometimes it is the fundus of the womb that contracts thus spasmodically, while the rest of the organ hardly contracts at all; sometimes, again, it is one of its angles, a portion of its anterior wall, of its posterior wall, or one of its sides. The pains are not less acute than they would be if the whole organ contracted, they may even be more severe; but they are entirely wasted, or at least are far from having as much influence on the progress of the labor as the regular contractions. If the parietes of the belly are not too thick, we can, by applying the hand upon the hypogastrium, feel that the uterine ovoid is not even, that there are lumps or inequalities, and that, too, independently of the form of the foetus. These spasmodic contractions, described with care by Denman, are the uterine tetanus of Wigand, when they are permanent or embrace the whole organ at once.

Whenever the general state of the patient does not contra-indicate it, we must here also have recourse to bleeding, then to baths, and next to simple anodynes, diffusible antispasmodics, opiates, &c. I, for example, use with success a potion composed in the following manner: R. Lettuce and wild poppy water ℥iv, orange-flower or mint water ℥j, syrup of pink or white poppies ℥j; or syrup of marsh-mallows ℥j, with extract of opium gr. i, or laudanum, from gtt. v to gtt. x. Simple frictions on the belly, long continued, also succeed pretty often. They are sometimes performed with the hand alone, or with a flannel, either dry and hot, or wet with oil of chamomile, camphorated alcohol, or Cologne water, &c. Although nature herself frequently succeeds in restoring the natural order of things, this state is, notwithstanding, not to be overlooked; in the first place, because it indefinitely prolongs the labor, and in the next because it may be looked upon as a morbid state, or at least as evidence of great predisposition to disease, or to inflammation of the womb. In one case related by Mesnard, the lower extremities were, as it were, locked in the placenta, and there resulted thence real difficulties in the extraction of the child.

C. *Spasmodic contractions of the os uteri* have also been observed, and I have several times seen its dilatation completely arrested, or considerably retarded for hours together by this irregularity, which in general requires the same treatment as the preceding. MM. d'Outrepoint and Riecke have even seen the neck of the womb spasmodically contracted for several hours on the part of the child

that had passed through. In some instances, the os uteri is at the same time very sensitive, dry, hot, irritable, and painful, although regular in shape.

Belladonna.—A precious means in such a case, and far more efficacious than hip baths, emollient and mucilaginous injections, or than ointments of any kind is the belladonna, already extolled by Evers, and which has lately been proscribed, as well as opium, in Germany, in a work in other respects worthy of praise. Be very careful as to the employment of narcotic extracts, says Kilian: it is true they promote dilatation, but, preventing contraction of the neck of the uterus, they cause terrible floodings. The belladonna ointment, proposed by Chaussier and Dr. Conquest, has been frequently made use of by Madame Lachapelle at the *Maison d'Accouchement* at Paris. Its employment, too, is followed with no inconvenience, and does not require the use of the speculum, or the piston devised by Chaussier, or any kind of syringe. When I have occasion for it, I direct one drachm of the juice or extract of belladonna to be triturated with one ounce of cerate or hog's lard; with the fingers I easily introduce a portion of this ointment, as large as a filbert, up to the os uteri, the whole circumference of which is soon anointed with it. The belladonna acts here as it does upon the iris, when applied betwixt the eyelids a few hours previously to performing the operation for cataract, and often with a promptitude that is really surprising.

In the spring of 1825, a young woman, of good constitution, was seized with labor pains at five o'clock in the evening; the labor went on regularly all night. The next morning, at six o'clock, the os uteri was as large as a half crown piece at least; from that time the dilatation progressed slowly, although the force of the pains did not diminish at all; a vein was opened in the arm; the agitation of the patient went on increasing, and the orifice continued in nearly the same state. M. Ribail, who had the care of the woman, sent her to the hospital, where I saw her at half-past six in the evening: the os uteri was a little larger than a five franc piece, and formed a thin circle, almost sharp, hot and extremely sensible; the pains still continued; the ointment was applied at seven o'clock, and before the clock struck eight the delivery was completed.

Conclusive as was this result, it nevertheless appeared to me difficult to attribute it exclusively to the action of the ointment, but since then I have used it in five different cases, and in all of them the effect has been, if not altogether so prompt, at least quite as undeniable. Mandt, Blackett, Ricker, &c., have also obtained similar results. Perhaps the cerate of opium might have the same effect, but I have not had occasion to try it.

Opium, whether in the extract or the tincture, inordinately extolled by some English practitioners, as an *oxytocic remedy*, might well prove very efficacious in the different cases of irregular contraction of the uterus. Levacher, who has seen frequent use made of it at St. Lucia, has given me a wonderful account of it, and says that he has himself obtained astonishing effects from the use of laudanum. He has carried the dose as high as two hundred drops in the space of a few hours, and believes it to be more efficacious than spurred rye. No narcotism supervenes, and the action of the opium seems to be concentrated on the womb, contractions of which soon become regular.

I doubt, however, whether it be suited to "inertia," properly so called, and whether it can in reality be compared to spurred rye.

§ 3. THE BAG OF WATERS.

I have elsewhere stated in what manner the premature rupture of the membranes, or their too long continuance in an unbroken state, might retard a labor or render it a bad one. A lady, attended by Madame Laugel, principal midwife of the Clinic at Strasburg, had six abortions from the thinness of the membranes. M. Deubel, examining the after-birth of the last case, was enabled to give evidence as to the tenuity and want of solidity of the fetal envelopes. In the former case, noted by Moschion, we ought to do everything in our power to

favor the dilatation of the orifice without increasing the power of the uterine contractions, for it is important to relieve the fœtus as soon as possible from the dangerous compression it has to suffer. To fulfil this indication, it appears to me to be proper to direct the woman to walk about, to moisten the parts in some way, and especially to have recourse to the ointment of which I have just been speaking.

Dry labor.—Although it be not critically correct to say, with Merriman, that the earlier the waters are broken, so much the more certain is labor, it is right to remark that, even though the membranes be prematurely ruptured, the amnios is scarcely ever completely emptied before the passage of the head. The dryness of the vagina and neck, generally attributed to this rupture, depends on an entirely different cause. It is owing to irritation, to absence of mucosity, and secretion in the sexual organs. Consequently, antiphlogistics and emollients, as shown by D'Outrepoint, and as Hippocrates prescribed, are the proper remedial means.

We should not dread the premature discharge of the waters in labor. Puzos says, "Those who have had some experience do not entertain such a prejudice." Meissner, who admits that the waters are sometimes absent in the ovum, says that, in a case related by Mende, there was not one ounce, which did not prevent labor from being rapid and easy. In another woman, seen by Hobnbaum, not a drop was observed, and the labor lasted but an hour.

In the latter case, that is, where the point of the ovum is too slow in giving way, it must be ruptured. To be done without inconvenience, this little operation requires the combination of the following conditions: 1. That the dilatation shall be, at least, very much advanced; 2. That the child shall be in a good position; and, 3. That there shall be no other obstacle to the delivery.

Should the os uteri not be largely dilated, we should be exposed to the inconveniences connected with a premature rupture of the membranes; if the womb should cease to contract, or contract only a little, we might give rise to complete inertia and all its consequences; were the fœtus badly situated, we should increase the dangers of the presentation, and should the resources of art become necessary, their application would be far less easy. But it should be well understood that these general rules are not without exceptions; for instance, where the fluid enclosed in the amnios is in too large quantity, it may be allowed to escape even although the opening of the cervix is not considerable. Ritgen maintains, even, that it is a means to be employed to hasten labor, when it delays too long making its appearance, or when pregnancy appears to be prolonged beyond the natural term. It is, in fact, certain that labor may in this manner be brought on, and that it is a powerful preventive, and not a cause of uterine inertia. Facts collected in the amphitheatre of Maygrier by Clement, and my own observations, plead strongly in favor of the doctrine.

Hydramnios, carried to the extent to benumb and weaken the action of the uterus, would therein find its most efficacious remedy. Whether it result from inflammation of the membranes, as Mercier thinks; from disease of the fœtus, as Lee believes; from an alteration of the uterus, as in Ingleby's case; or from a predisposition of the woman to hemorrhage, as Mr. Epps seems to admit, it is still always true that it promotes singularly inertia of the uterus, and that, judging by the observations which have been related, by those of Mercier, Duclos, and Moreau, it is an accident not to be neglected.

The same holds, too, where the position of the child is not fixed; where the hips, shoulders, head, or any other part is found to present by turns at the centre of the strait. In this case, we seize the moment when the head is well situated to rupture the membranes, because, were this rupture left to nature, it might as well take place while it is unfavorable as while the position is favorable. Where the bag of waters does not retain the shape of a segment of a sphere, is very

much elongated, or pyriform, its presence being no longer of any use as to the progress of the dilatation, it should be broken without too much regard to the degree of the dilatation. The same principles guide us in respect to the strength of the pains. Their absence ought not always to deter us, for the rupture of the membranes is often the best, and sometimes the only means of restoring them.

To effect this rupture there are a thousand different modes of proceeding: the point of a bistoury, of a pair of small scissors, of a common sewing-needle or a knitting-needle, of a pin, directed by the pulp of the forefinger, has often been found sufficient, and perhaps been employed with advantage; for one must be very unskillful or careless seriously to wound the mother or fœtus with either of these instruments. However, at the present day we proceed generally in a different manner; the membranes are scratched through with the finger nail, while they are tightly stretched. Following the example of Rhazes, of Smellie, and of Levret, we should scratch with the nail the projecting part of the ovum whilst it is most strongly on the stretch. Does M. Busch, who opposes this plan, believe that he runs less risk with the kind of curved scissors that he seems to prefer, in imitation of Siebold, in such cases? Others endeavor to burst them with the end of the finger by suddenly pushing upon the tumor from its point towards its base; and, if the first attempt does not succeed, we make a second, a third, &c., always during the height of the pain; or again, and the method is a better one, we firmly pinch a fold of the membrane, while in a state of relaxation, and in such a way that the next contraction of the uterus, in essaying to form the bag again, does not fail to rupture them.

After having thus pinched the membranes, Barbaut was careful to scratch them against the thumb with the nail of the forefinger, to break them, and empty them more quickly. Nevertheless, as has been known since the time of Ætius, and as recently inculcated by Clement, it is owing to the rigidity and the thickness, whether morbid or natural of the membranes, that the bag of waters remains entire, and we are sometimes obliged to perforate it with a cutting instrument.

When the membranes have given way spontaneously very high up above the cervix, and the tumor that had engaged in the vagina does not disappear, and seems to interfere with the progress of the natural phenomena of the labor, we ought most generally to perforate them as if nature had not yet effected it. Lastly, when the membranous sac does not permit the liquor amnii to escape until long after the dilatation of the orifice, it is generally found that the rest of the labor proceeds with great celerity, and the woman should always, from the time the rupture takes place, preserve a horizontal posture.

§ 4. FALSE WATERS.

Moreover, we must not at the onset of labor allow ourselves to be deceived by what are called *false waters*. The flow of this foreign liquid, which takes place more frequently during the period of pregnancy than at the moment of labor, appears not to depend in fact on the premature rupture of the summit of the ovum. Peu, who takes strange ground against the matrons, because they admit two kinds of waters, the first and the second, has failed, doubtless, to remark that these women find their justification in the false waters pointed out by Levret himself. Mauriceau says that some women yield three or four pints of this fluid several months before labor, and, however doubted by Madame Lachapelle, their existence is at present no longer disputed except by few persons.

Their exact seat has not yet been determined. Do they depend, 1, on rupture of a lymphatic vessel, or of an hydatid, as presumed by Rœderer and Denman; 2, on a transudation of the amnios, as stated by Baudelocque and Orlob; 3, on a fissure, or fraying of the membranes, as many physicians have thought; 4, on an accumulation of liquid between the chorion and amnios, as admitted by Oslander, Madame Boivin, and others; 5, on a dropsy of the membrana decidua, as some authors appear to have thought?—or, 6, are they but the result of a true

accumulation of water, as Geil, in imitation of Nægele, endeavors to show? It would be difficult to say how far these different suppositions are well founded; for, whatever Geil may say, we can imagine that the false waters may depend occasionally on either cause. But I am induced to maintain, from my own observation, that they depend particularly on hydrometra and dropsy of the chorion, when they cannot be explained by abrasion of the membranes.

§ 5. INERTIA OF THE UTERUS.

Another cause of protracted labor is the weakness, whether absolute or relative, of the uterine contractions. This is almost always the cause that is kept in view by the authors of oxytocic remedies. Nevertheless, it is far from being the most common one, and as the means proper to overcome it are most generally hurtful in the other cases, it is easy to explain the discordance met with in the works on the effects of substances employed to accelerate the process of parturition.

When the inaction of the womb is evident, and depends neither upon general nor local fatigue, when it prevents the labor from proceeding, and the attention and regimen which were spoken of at the commencement of this article have been tried in vain, after having imitated Puzos, who recommends the head of the child to be pushed up between the pains, to allow the waters to escape, and especially when, instead of diminishing, it goes on increasing, hour after hour—those substances that seem to exert a special action on the gestative organ should be tried. It is in these cases that small injections of senna are indicated; that stimulants in general have had some success; that bicarbonate of soda, extolled by the ancients, by Homberg amongst others, and brought as a secret from Italy in the time of De la Motte, and re-introduced in our day by Lobstein, L'Offier, and Hufeland, might be administered, remembering, even then, that the accouchement often terminates whilst they are looking for, or have gone for the remedy, as De la Motte, who prefers the hand to all the other remedies, shows by a singular instance. Electro-puncture, twice successfully used by Sarlandière, may also be tried before having recourse to the forceps, which Dupont de Lille has the courage to extol in such cases, after having tried it on five women, of whom two died, and two suffered different accidents. The same may be said of galvanism, recommended by Herders. But we know at present two remedies which appear to deserve the preference above all others, and of which I shall speak more in detail. I mean the ergot of rye, and abdominal compression.

§ 6. ERGOT.

History.—The ergoted rye seems to have been used from time immemorial by the old women, and by some country midwives, for the purpose of hastening delivery; it was mentioned in the *Acta Natur. Curios.* for 1668, by Camerarius, and the name of *rye of the womb*, of *Rockenmütter*, and of *Mütterkorn*, adopted by the Germans, is a sufficient indication that the idea is not new. These traditions of the vulgar at length attracted the attention of the profession, and M. Desgranges published his first researches upon the oxytocic properties of the ergoted rye in the *Gazette de Santé* for 1777. Since that period, numerous observations have been collected and made public in the American, English, and French journals, &c. &c. Stearns, Prescott, Chapman, Bordot, Goupil, Chevreul, Gendrin, Bigeschi, and especially M. Villeneuve, have collected an infinite number of facts that prove decisively that the ergot of rye is capable of restoring the contractions of the womb during labor. Dittmer has already pointed out its obstetrical properties. Parmentier says that the ladies Dupille de Chaumont made frequent use of it. It was also employed by a nurse, mentioned by Desgranges; and Madame Vielmi, who learnt it of a midwife, long since dead, employed it before it was thought of by us.

However, MM. Désormeaux and Capuron do not appear to have much confi-

dence in it, and Madame Lachapelle has published a long series of experiments, which tend to show that it enjoys no property of the kind, whether given in fine or coarse powder, in infusion or in decoction, in extract or in syrup. It has been much condemned. Capuron, who has unequivocally declared himself opposed to it, denies that it has any advantage, and believes it perfectly useless. Jackson has opposed the use of it with no less warmth in America, and in England Hall is seen to throw it altogether aside. The fact is that it is strangely abused, and that numerous successes attributed to it are simple coincidences. But that does not prove anything against its efficacy. The paper of Chevreul, that of H. Davies, those of Roux, of Mitchell, of Wiggers, of Roche; the thesis of Malartic, who succeeded twenty-one times out of thirty-two trials; that of Godquin, who used it forty-two times with advantage; and the numerous observations of Kimbell, leave no doubt upon this point. Voillot also relates three examples; Campaignac and Merry each five; Toyl and Latham each one; P. Guersent five; Blondin three; Morin and Painchaud three; Doumenc four; Malapert three; Lefrançois three, in favor of its action on the uterus, which Schneider confirms by a hundred observations.

Granting that some of these facts may not be very conclusive, among them two of Voillot's, two of Roux's and of Bardoulat's, it is very difficult to resist such a mass of proof, inasmuch as we can yet add to them the several trials of Bardoulat, Luroth, Threlfull, Blundell, Boards, Sewell, R. Smith, Bradfield, Lobstein, Bonfils, Holl, Brunati, Ryan, and the daily practice of a host of physicians.

In the last four years I have used it more than twenty times; M. Delanglar and M. Verreux, Gorse, and a number of other practitioners, have also used it at my solicitation, and in every case its action has appeared to be evident, undeniable. It forces the uterus to contract in a few minutes, in a quarter of an hour, or, at most, in twenty minutes after it is exhibited. I have very recently had another most convincing proof of its efficacy. To a young woman who had been twenty-four hours in labor, I gave three doses in the space of forty minutes; within five minutes after the first one, the pains, which had for several hours been very feeble and slow, suddenly became strong and very frequent, but soon relaxed again; the second dose brought them back in the same way. They diminished a second time, and it was not until after the third dose that they were maintained until the complete expulsion of the fœtus, which soon took place. It is thus that it almost always acts.

Doses and administration.—I prescribe it in the quantity of fifteen or twenty grains in a spoonful, or half a wineglassful of sweetened water, and repeat the dose two or three times, at intervals of fifteen or twenty minutes. Perhaps a larger quantity may be safely given. Parmentier took half a drachm of it; Cordier two drachms; MM. Lapre and Campenon a drachm, and a drachm and a half, for several days together, without experiencing any sensible effects from it. Its use might, therefore, be continued for a long time and in large doses, before any well-grounded fear of inducing *ergotism* could be entertained.

Lalesque even relates the case of a woman who in twenty days took ten ounces of the decoction, and that of another who used eight ounces in the course of a month, without any ill effect. Lannoyon says, also, that a considerable quantity may be given without inconvenience, and Young maintains that in doses of less than a drachm, good effects are rarely obtained. Upon this point, it must be observed that it is difficult to decide. So many circumstances may alter the action of ergot, that we rarely know whether the article employed possessed all its properties.

It is to be hoped that the chemists will ere long separate the essentially active principle of this substance. MM. Desgranges and Lapre have already observed that four or five grains of the bark produce a greater effect than twelve or fifteen of the entire grain. Comparative experiments made by MM. Betscher and

Kluge tend to prove that that which is collected in the fields is far more active than that gathered in the barn, and Blundell believes, with South, that its active principle is an alkaloid. I doubt not but that in a short time a preparation will be discovered of uniform strength. In the meanwhile, the fine powder of the whole of the ergot appears to me to be preferable to the decoctions or the extracts, provided it be fresh and derived from grains that are entire and well preserved. It may, indeed, be conceived how so many different opinions may arise as to its strength and properties, when that which is employed has undergone a change.

Balardini and Roux gave it in wine. Maygrier prescribes eight grains in water, every quarter of an hour. It appears that Girard tried to inject it into the veins of a cow.

Its value.—If there be some who doubt its efficacy, a far greater number fear the energy of ergot. Some look upon it as a dangerous abortive agent. Oslère, for instance, says that it produces abortion not only in women, but in brutes. Thomson rejects it for the same reason, as does Duchateau, who employed it only to hasten the delivery of the placenta, or to arrest hemorrhage. In confirmation of its influence on the uterine system, Maurice cites the observation that the hens of Sologne lay but little in consequence of its effects on the oviduct. The same might be said of the ergot of maize, which, according to Roulin, causes the hens to produce eggs without shell. Although its abortive effects are not so far absolutely demonstrated, it would be, nevertheless, prudent to avoid using it in the case of pregnant women except during labor. The administration of ten ounces in twenty days to a woman in whom pregnancy was uninterrupted, proves nothing, because the decoction, and not the powder, was taken, and because in this case it was not known whether the ergot was damaged.

Other practitioners have thought that it might injure the woman, distress the digestive organs, and induce gangrenous ergotism. An instance of this last accident has even been published by Robert de Langres; but it is easy to see that in this case gangrene had nothing to do with the use of the rye. The researches of Courhaut, and of Neale, and what daily takes place in Sologne, show that its power of producing mortification is engendered only by its too prolonged use or by an excessive dose. Some women, in fact, vomit it or bear it badly; but there follows no ill effect.

It has been feared that it would render labor difficult; but Ingleby says that a practitioner of his acquaintance, who has tried it more than two hundred times, has seen nothing to sustain such an idea. On the other hand, we shall see that ergot is an excellent means to hasten the expulsion of the placenta.

Its opponents have especially accused it of injuring the child. Girardin says that it is a popular belief in America. Merriman, who has not a very exalted idea of it, adopts this opinion. So thinks Burns; and Ingleby remarks that still-born fetuses are very common in the United States since the frequent employment of spurred rye. Moreau, who has tried it but once in twenty years, cites five instances of children born dead, when it was made use of in the practice of some other physicians. Evrat and Deneux recommend also on this account that it be used with the greatest caution.

My own observation leads me to partake partly of this view. Out of forty cases in which it was given either by myself or some one of my colleagues, I have seen seven children born dead. It is true that, in the case where I was called in by MM. Leseble, Cisset, and Malgaigne, death may readily be attributed to the length of the labor; but in some others, in two particularly, I have found difficulty in not ascribing it to the ergot. It is an accident which has been accounted for in different ways.

Mr. Charles Hall pretends that ergot does not act directly upon the womb;

that its deleterious qualities in the first place alter the natural qualities of the blood of the mother, then that of the child; and that, if the uterus contracts, it is only to withdraw the fœtus from the poisonous action of the medicine. It is an explanation which appears to me to be completely void of foundation. Women generally present none of the phenomena of intoxication during the effects of the rye, and the circulation of the fœtus suffers in a different manner. Hosack and Houston believe, on the contrary, that the child runs risks on account of the difficulty that the blood has in passing from the womb to the ovum. This opinion, though defended by some distinguished accoucheurs of Paris, is destitute of foundation, inasmuch as there is no direct utero-placental circulation.

If the fœtus perishes at that time, it is because under the influence of the ergot, not only the organic action, as might be thought, but the whole contractile power, of the uterus is brought into play. The efforts of this organ, repeated at very short intervals, having no complete intermission as in natural labor, act in such a manner that the child is soon so compressed that the circulation of the placenta, the movements of the heart, the course of the fluids in the cord and even in the viscera, undergo obstructions that may become dangerous.

For this reason I have been led not to give rye in the commencement of labor, notwithstanding the assurance of Mitchell, and not before I am almost certain that one or two hours' efforts at the furthest will be sufficient to terminate the accouchement. In addition, I think I have observed that its action is often very feeble, null and void when the child is dead. The eight trials that I have made of it in abortion, without having so far given me perfectly conclusive results, permit me, nevertheless, to recommend it in these cases as an excellent means. I have seen, too, that, if it does not act at the end of twenty or thirty minutes, we can scarcely depend on its effects. In that I agree with Mr. Young, and believe with Dewees that the contractions brought about by it are distinguished by their permanency from ordinary uterine contractions. They are, as Moreau says, true pathological contractions. At all events, I should not fear more than Emery does to give it to women in their first labor, when the conditions above indicated exist. In forbidding it at that time, Moreau and Villeneuve are justified only on account of the resistance presented by the soft parts to a first child, and inasmuch as it might be given too soon.

In order that the ergot of rye may be given with some chance of success, and without any danger, it is necessary, 1st, that there should be no manifest tendency to hemorrhage from excess of irritation; 2d, that it be possible for the delivery to take place through the natural passages; 3d, that the child be in a good position; 4th, that the cervix be soft and dilatable; 5th, that the general irritability be not too great; 6th, that the digestive organs be in a good state; and 7th, that the weakness of the uterine action shall depend upon the want of irritability of that organ. M. Legras advises that it be given, also, for the purpose of steadying the head at the superior strait previously to applying the forceps.* Its utility in tokology is, as far as I am concerned, a settled point, as

* Many children perish in this country from the improper use of ergot. The power of the article ought not to admit of further doubt: it excites generally, within thirty minutes after its exhibition, a contraction of the womb which does not wholly cease until the child is born; or, in case of any insurmountable resistance, until the strength of the uterus is exhausted. The ergotic pain is a single pain; hence, if the parts are not in a state to admit of the proper dilatation, the ergot destroys the child by causing a contraction or spasmodic effort of the womb, which presses the placenta so firmly and so long against the fœtus, that the utero-placental intercourse is as effectually destroyed as it would be were the after-birth detached. The child which is killed by ergot dies, therefore, by asphyxia from the compression of its placenta. Where the os uteri is well dilated and yielding, and the vagina and vulva in a similar condition, no danger can ensue upon the use of this powerful and valuable article.—M.

clear as that of quinine in intermittent fever. The reasonings of Jackson, of Capuron, and of Lascauve will not affect it. The only point is to prevent the abuse of it by trying to regulate its use.

§ 7. ABDOMINAL COMPRESSION.

One expedient which might be tried before the spurred rye, and which is particularly adapted to fat, lymphatic women, in whom the belly is soft, or muscular action but little developed, is the application of a bandage over the abdomen—a belly-band. This plan, the discovery of which has been disputed by Messrs. Allen and Waller, seems to be derived from the Kalmoucks. Martius says, in fact, of these people, that during labor they knead and compress the belly of the woman with girths or straps. Ingleby for his part says that it is a useful precaution in the case of extreme suppleness of the abdomen. I have employed it myself, since 1826, for a case of very strongly-marked anterior obliquity, to correct the efforts of the womb, and again to put a stop to some symptoms of false labor, in a woman who had completed but seven months of pregnancy. Rognetta says that he found advantage from it in a case in which labor had stopped several hours. It is proper to remark that it is not an excitant, but only a support given to the womb, and that the abdominal bandage acts here like the belt worn by runners, by furnishing a *point d'appui* for the abdominal muscles, as well as for the uterine contractions. Besides, as no ill effect can result, I do not see why we should deprive ourselves of such an aid when labor is progressing slowly, or when the abdomen is sufficiently prominent or sufficiently developed to need support. A napkin, well spread out from the pelvis to the umbilicus, and firmly secured towards the loins, with another napkin underneath, form the entire apparatus, which each one can apply after his own fashion.

SECT. II.—OF DYSTOCIA,* (OR DIFFICULT LABOR, PRETERNATURAL LABOR, LABORIOUS LABOR, MECHANICAL LABOR, MANUAL LABOR, ARTIFICIAL LABOR, &c.)

Labor ceases to deserve the title of spontaneous whenever, by leaving it wholly to the powers of nature, it threatens to become dangerous either to the mother or child. These kinds of labor were for a long time designated by the simple epithets of *preternatural* or *laborious*: but the distinct acceptation that was attempted to be given to each of these qualifications being quite arbitrary, too much confusion has ensued among the authors who adopted them not to make it desirable to replace them by others. As the term *dystocia*, employed by Hippocrates, Sauvages, and M. Désormeaux, expresses all the cases that require the assistance of art, it appears to me the most proper one, and will doubtless be preferred at a future day as a generic term.

As to the subdivisions to be established, it is contrary to the rules of reasoning to found them upon the means that are employed where nature is insufficient for us any longer to conform to the principles laid down by Solayrès, Baudelocque, &c. The faults of such a method are too evident for it to be necessary to enumerate them; it should suffice to remember that, by following them, the same cause of dystocia, the same accident, for example a hemorrhage, may by turns cause the same fact to be classed among the preternatural, laborious, mechanical, mixed, manual, &c., labors, according to the ability or pleasure of the accoucheur.

It is, therefore, infinitely better to base them upon the causes that may give rise to difficult labor. This plan, which has been adopted by Merriman and M. Désormeaux, exhibits real and indisputable advantages; it readily applies to all

* From *δυσ* difficult, painful, unfortunate, and *τοκεῖν* "accouchement."

possible cases, enables us to reduce or multiply genera and species without in any way interfering with the general classification, and, besides, can combine with all the other methods proposed by the various authors. After all, difficult labor is characterized by the accident which complicates it, and not by the kind of assistance required in it.

The *causes* that render labor difficult depend either upon the mother or the child. Some of them are unforeseen, or do not occur until the moment of parturition; the title of accidental may be appropriated to them. Others exist beforehand, and render the labor necessarily difficult, which merit the denomination of pre-existing causes.

The *accidental* or unforeseen causes are: any serious disease, such as inflammation of the brain or its coverings, of the lungs or pleura, of the peritoneum or uterus, &c., which takes place during labor: any hemorrhage sufficiently abundant to endanger the life of the mother or her offspring; convulsions, syncope, laceration of the womb, the premature escape of the cord, hernia, aneurism, asthma, great debility, &c., and some positions which do not become bad until after the first pains.

The *pre-existing* causes are: deformities of the pelvis, malformation or disease of the organs of generation, calculus in the bladder, fibrous, or other tumors in the excavation, deformities in respect to height, transverse positions, monstrous conformation, and diseases of the fœtus.

As these different causes are in reality only complications of labor, it follows that dystocia comprises all cases of complicated labor, as eutocia comprehends all simple labors.

ART. I.—ACCIDENTAL DYSTOCIA.

§ 1. OF HEMORRHAGE.

Whether the hemorrhage be an epistaxis, a hemoptysis, a hematemesis, a hematuria, or a metrorrhagia, any one may conceive that the efforts of child-birth must to a considerable degree augment the danger which accompanies it. In the four first-named cases we are to act as we should do in relation to hemorrhages in general; and if the blood still continues to flow, we should begin to think of terminating the labor as promptly as possible; the fifth-named case, uterine hemorrhage, is met with so frequently, and constitutes an accident of so serious a nature, that it becomes necessary, in this place, to examine it, not only as a complication of labor, but also as one of the essential and distinct diseases of pregnant women. Hemorrhage from laceration of the uterus or of some of the neighboring vessels will be examined in other articles.

This hemorrhage is called *internal*, *latent*, or *concealed* hemorrhage, when the blood that flows from the vessels is retained in the womb, and does not escape from the genital organs; it is, on the contrary, denominated *external* or *apparent*, when the sanguineous fluid escapes from the genital organs as fast as it is poured out by the mouths of the vessels.

A. *Causes*.—Two kinds of causes are recognized, *efficient* causes, and occasional or *determining* causes. There are even also *predisposing* causes.

1. *Predisposing causes*.—It has always been observed that certain women are scarcely ever in labor without suffering from hemorrhage. The unpublished observations of Bellivier and of Mlle. Florian, to which Guillemot, who published them, has added his own and those of Desgranges, prove that such a predisposition can be easily recognized. Evans, who has taken up the same question in England, mentions a woman who had had flooding in nine labors, and to whom he was called for the tenth time. The placenta over the neck of the uterus might possibly account for such recurrence of hemorrhage in some cases, inasmuch as women who have it once so placed, run the risk of its being developed in the

same situation in succeeding labors. Mr. Ingleby instances one person in whom it was so situated three times successively. He observed the same thing ten times in another case. But we must, nevertheless, refer the cause in most cases to a general condition. Soft, nervous, lymphatic, delicate constitutions, fair women who have menstruated early, and in whom the menstrual flow is abundant; those who, moreover, are endowed with lively sensibility, or are marked with ephelides, with a delicate skin, and who in addition have large eyes, with highly-colored cheeks, are so liable to hemorrhage, that the accoucheur should be on his guard against this accident each time that they are with child.

2. *Efficient causes.*—From the time of Puzos, accoucheurs have generally placed the *efficient cause* of flooding in the detachment of the placenta; they state that the placenta separates itself from the internal surface of the womb, and thenceforth the blood flows abundantly from the large and numerous vessels which open on it. This opinion appears to me to be ill-founded. Puzos and his partisans have mistaken the effect for the cause. It is not the detachment of the placenta that produces the hemorrhage, but the hemorrhage, on the contrary, that detaches the placenta. Blows, falls, and great shocks may certainly affect the womb and its contents; but, as the ovum constitutes a full bladder in immediate contact with the whole extent of the cavity of the organ that contains it, the most violent commotions would not be able to detach it. While ever the membranes remain unruptured, it cannot be conceived how the adherences of the placenta can be destroyed otherwise than by the efforts of a fluid endeavoring to effuse itself into the cavity of the womb. It is astonishing that such a doctrine should have been maintained so long by so many celebrated men; for, even admitting a previous detachment of the placenta, we should still have given no explanation of floodings. In fact this detachment takes place every day, either wholly or partially, from the middle stage of the most natural labor, and, notwithstanding, there is no hemorrhage. Besides, an anatomical disposition that has no real existence is relied on here; the ovum is merely stuck (*plaqué*) on the inner face of the womb, and not intimately united to it; the placenta and organ of gestation communicate with each other only by means of pores, and not by means of large vascular mouths.

The efficient cause of flooding seems to me to be analogous to those of all other hemorrhages, to that of epistaxis, for instance. The sanguine exhalation takes place in the womb as it does in the nose, under the influence of a local congestion, an affluxion, a peculiar state of irritation, of the *molimen hemorrhagicum* so much talked of by Stahl. When this affluxion, or *molimen*, exists to a certain degree, the blood transudes with greater or less force, and from a more or less extensive surface, as happens during the presence of the menses; only it requires a stronger impulsion, because, during pregnancy, the ovum that it is compelled to detach in order to effect a passage necessarily presents a certain degree of resistance to it; moreover, it seems to me that, in respect to its intimate mechanism, a uterine hemorrhage that does not depend upon any traumatic lesion, is always the same, at whatever period and in whatever condition it may occur, as well during gestation as during and after parturition.

The idea which I now set forth, and which is nearly similar to that which has already been taught by Costa, M. Désormeaux, Madame Lachapelle, and M. Duges, merits the most serious attention, and ought to have great influence on the therapeutics of flooding, and upon some other points of tokological science.

3. The *determining causes* are as numerous as they are diversified; they may be referred to a general state of the woman, to a peculiar state of the sexual organs, and to external accidents.

Stoll, Finke, and other observers have remarked that, during the prevalence of certain epidemics, all the bilious affections were accompanied with metrorrhagia. It has been stated that verminous diseases, various lesions of the alimentary canal,

and all those indispositions that are accompanied with sympathetic reaction upon the womb, are capable of giving rise to it. Fatigue, frequent attendance at balls, plays, whole nights passed without sleep, and exciting regimen, heating liquors, purgatives, the warm bath, substances used to produce abortion, moral commotions; in fine, whatever tends to render the menstrual flux more abundant and more precocious, is also capable of giving rise to the flooding. To these causes may be added an ulcer, a polypus at the neck of the womb, fibrous and other tumors in the substance of the parietes, or in the neighborhood of the external surface of the uterus, criminal manœuvres, and everything calculated to produce a determination of fluids towards the pelvis; violent exertions, the jolting of a rough-going carriage, riding on horseback, efforts to carry or lift a heavy burden, coughing, vomiting, shocks communicated to the trunk of the body by falls upon the feet, the knees or seat, blows on the abdomen or pelvis, diseases of the rectum and bladder; in one word, all conditions, whether of temperament or of disease, all circumstances, whether natural or eventual, that are capable of producing a sanguine congestion, a *raptus* towards the vessels of the womb, and all the causes of abortion; so that pregnancy and labor in themselves constitute one of its most powerful causes.

4. *Placenta prævia*.—In some particular cases, an *entirely special* cause of hemorrhage is superadded to the preceding ones, and may of itself produce the flooding. I mean the implantation of the placenta upon the cervix uteri. "When there is a flow of blood," says Guillemeau, "it is generally the placenta which first presents itself." Mauriceau had already known the fact, and so had Viardel. P. Portal mentions two cases. Peu also gives several observations. Amand had previously remarked that, in a case of flooding which lasted fifteen days, the placenta, partly detached, was attached to the neck. This practitioner managed the labor, delivered the child alive, and the mother was well on the eighteenth day. De la Motte has not passed it over in silence; and Deventer recurs to it frequently. Only it may be seen that the authors did not have a clear conception of it. They do not seem to have thought that the placenta was developed on the neck. All give us to understand that it had fallen there from the fundus of the uterus, where, according to them, it was constantly inserted. Gifford and Levret were the first to give an exact interpretation of the fact, but Petit had announced it, since the year 1722, to the Academy of Sciences, on the occasion of a woman dying in three days from a hemorrhage of this character; and Levret himself finds instances in Schacherus, V. Horne, Platner, Brunet, and Heister. It is singular, then, to find Cross ascribing a share of this discovery to Rigby, who wrote long after, and to find that Ingleby should have given a history of it without saying a word about Levret!

Whether the placenta corresponds to the orifice by its very centre, or by some point more or less near its circumference, there results, nevertheless, a hemorrhage the distinctive character of which is that it occurs only in the last months of gestation, or from the period when the cervix uteri begins to dilate from above downwards. Nothing proves, in spite of the assertion of Burns to the contrary, that it sometimes is the case from the third month. The authors who attribute it to the rupture of the utero-placental vessels have certainly been deceived by theoretical prejudices, or false anatomical appearances. I offer the following as the results of several observations collected with great care.

When the placenta is inserted upon the neck of the womb, these two parts proceed together in their development until about the fifth, the sixth, the seventh, and sometimes even until the eighth month and a half; varieties that are very easily explained by admitting, with Busch, that one of the presumable causes of the implantation of the placenta on the neck is the abnormal development of the uterus. But from that time forwards, the environs of the orifice are so rapidly withdrawn from the centre, that a constantly increasing portion of the ovum

necessarily remains without any adherence to the womb, and this portion, which is soft, vascular, and constantly on the stretch, may crack, or even tear, and thus give rise to a hemorrhage which puts the child's life much more at hazard than the mother's. On the other hand, this displacement does not in general take place without the inferior portion of the womb being more or less irritated by it, and soon becoming the seat of an affluxion, a more or less decided congestion, and thenceforth the *general efficient cause* of flooding is superadded to the peculiar cause, constituted by the presence of the placenta on the cervix. It is necessary for me to remark that these two causes, the rupture of some vessels of the placental parenchyma, and a state of congestion of the uterus, may exist separately; that, although the former almost always superinduces the latter, it is not, however, impossible for it to exist alone, and that the latter may pre-exist, or even exist to such an extent as to give rise to the most imminent danger, without necessarily combining with the other! Besides, it is well known that blows, shocks, vivid emotions, and all the other causes of ordinary uterine hemorrhage, are equally fitted to produce it where the placenta is inserted over the orifice. It therefore follows that both these kinds of flooding depend on the same proximate cause, the hemorrhagic *molimen*, and upon the same occasional causes; but that the presence of the placenta upon the cervix constitutes a peculiar determining cause, which rarely fails of being in itself sufficiently powerful to produce it. Stewart and Rigby are, however, wrong to look upon the insertion of the placenta on the neck as an *inevitable* cause of hemorrhage. The instances that I have brought forward, when speaking of the nutrition and circulation of the fœtus, show incontestably that these are exceptions, and that the placenta may be entirely detached and descend into the vagina without producing flooding. In one of the women spoken of by Leroux, the placenta completely escaped in a case of shoulder presentation, and produced, notwithstanding, but little hemorrhage. Chapman has seen it come down four hours before the fœtus. Perfect mentions a similar case, with less serious hemorrhage than might have been apprehended. The same may be said of the cases mentioned by Smellie. No one, besides, would dare maintain, with the ancients, and in opposition to Levret, as was done in Rigby's time by an author concealed under the title of an English midwife, that, in the cases in question, the placenta was originally attached to some other part of the womb, and that it had actually fallen on the neck. Perhaps, also, the blood comes less constantly than is thought from the portion of the uterus in contact with the placenta. Buisson says that, in a case of insertion of the placenta on the neck with hemorrhage, he found on the *chorion*, which should be in apposition with the fundus of the uterus, a clot of long standing as broad as the hand.

5. *Vessels of the cord and placenta.*—It is at present pretty generally believed that the vessels of the umbilical cord may break during labor, and give rise to one of the most serious kinds of hemorrhage. Peu cites a case of incomplete rupture of the cord during labor, and Vesten reports a similar one; but in neither of them was there either shortening or twisting of it.

To these cases we may add those of De la Motte, Levret, Busch, and Benckiser. I will give two examples of another kind of rupture. In one, which was communicated to me by Cazeaux, the *interne* at Hôtel Dieu, the vessels were torn between the amnion and chorion during the passage of the child. In the other, which I observed with M. Guillemot, the cord and the amnion came away alone after the delivery of the child, but the placenta and chorion remaining in the fundus of the uterus, rendered it necessary to introduce the hand into the organ to terminate the labor.

Doubtless it would not be wise to deny the possibility of such an accident; but it must be confessed that the observations relied upon to prove it are anything but conclusive. The one mentioned by De la Motte was evidently only a case

of ordinary hemorrhage. The blood had begun to flow previously to the rupture of the membranes; the woman rapidly grew weak, and the author believed that the hemorrhage took place from the cord, because he found one of its vessels to appear as if *eroded* to such a degree as to admit of the transudation of blood. Levret's case, when carefully analyzed, proves nothing more in favor of the opinion of the surgeon of Valogne; and the case by Baudelocque, who at first refused to coincide with the opinion of Levret, certainly ought not to have induced him to change his views. Had the rupture of the cord been the cause of the hemorrhage, the fœtus would not have been born alive in the cases reported by De la Motte and Baudelocque. In the example cited by Levret, the fœtus, it is true, was dead born, but the forceps had been employed, and the meconium continued to come away while blood was still flowing. In fine, in all three cases, the mothers became so weak as to excite the serious alarm of the accoucheur. Morlanne gives two examples; but in one the child was born dead without any hemorrhage; in the other, the rupture of the umbilical vein did not prevent it from being born alive. Let it suffice me to say that, in the actual state of our knowledge, the hemorrhage from the cord, as understood by De la Motte, Levret, and Baudelocque, can only be admitted as possible, and not as proved. In this respect, moreover, I agree completely with Mesdames Boivin and Lachapelle.

Nevertheless, the umbilical vessels and their branches, ramifying upon the foetal surface of the placenta, are sometimes subjected to rupture—I am in possession of several examples of the kind—but it is because they were previously in a diseased state, and that too generally in the early periods of pregnancy. Then the fœtus dies promptly, abortion takes place, and the hemorrhage is not discovered until the ovum comes to be examined. I have very often found embryos of six weeks, two months, &c., still enveloped in the membranes, separated wholly or partially from their cord, close to which were discovered one or more small clots of blood; at other times, small varicose or aneurismal sacs, sometimes upon the cord, sometimes upon the secondary divisions of its vessels, the walls of which are exceedingly thin, and liable to be ruptured by the slightest effort. In an after-birth at full term, I have seen some of these dilatations that had been ruptured, and which communicated with a large clot covering a part of the placenta, and which had not lacerated the amnios; but it is easy to perceive that this kind of accident is but indirectly similar to those spoken of by authors.

Benckiser, who has collected in his thesis most of the cases of divergence of the cord, and who reports an example of hemorrhage from rupture of a branch of the umbilical vein resulting in the death of the fœtus, is right, when he says that the labor should be terminated as speedily as possible, so that the flooding may not become dangerous if this condition is recognized before the escape of the placenta. Ingleby speaks of hemorrhage from the rupture of a central vessel of the placenta, in which, according to Coley, there was a deposition of two pounds of blood between the uterus and the after-birth. This is a new example of internal flooding, which proves, more and more, that this kind of hemorrhage is rarely dangerous before it changes into another variety. In another case of tearing of the placenta, Ingleby speaks of the clot as weighing eighteen ounces.

Some persons also think that hemorrhage may take place from the external surface of the placenta after its partial or complete detachment, no matter where its insertion. Joeger, who maintains this opinion at the present time, invokes in its favor the example, given by Mery, of a fœtus whose vessels were empty, because the mother had died of peritoneal hemorrhage; and another similar case, taken from Denis, in which he experimented on puppies; and also another, from Heister: but, altogether contrary facts being reported by Rœderer, Reuss, and Sœmmering, and the experience of every day proving that the fœtus does not

die exsanguine in cases of uterine hemorrhage, this hypothesis of Jøger has no real foundation

B. *Diagnosis*.—Uterine hemorrhages have certain common symptoms and certain peculiar signs; among the general signs, there are some which announce the approach of hemorrhage, and others which accompany or succeed it.

1. *Precursory signs*.—Although in some women the flooding appears on a sudden, and without any precursory symptoms, it is not the less true that this accident is almost always preceded by a more or less decided disorder of some function. Thus, one or more hours, or one, or even several days before the appearance of the blood, the individual has a sense of uneasiness, restlessness in the limbs, weight, fullness in the pelvis, alternate flushes and chills throughout the body, and rather more thirst and less appetite than common; flushes of heat ascend to her head; she has fits of giddiness, and becomes much redder or paler than in her habitual state; the pulse acquires strength, frequency, and quickness; there is, pretty commonly, a degree of febrile action.

2. *Signs of flooding*.—When a quantity of blood sufficient to excite alarm has flowed, the pulse loses somewhat of its strength and hardness, soon becomes irregular and tremulous; the face grows pale and the skin cooler; dimness of sight, ringing in the ears, and *weakness of the stomach*, which induce the woman to ask for some kind of aliment; yawning, pandiculation, nausea, lipothymia, syncope, and even convulsive movements appear in succession, and sometimes with frightful rapidity.

In external floodings, the precursory symptoms are succeeded by a discharge of blood from the external organs, and this characteristic is too evident for it to be needful to indicate any others; nevertheless, it has appeared to be difficult to some persons not to confound, at times, a real flooding with a simple menorrhagia. Baudelocque did all in his power to clear up this point of diagnosis: according to him, menstruation occurring during pregnancy differs from metrorrhagia, properly so called, in respect that it takes place without any pain, without effort, without any notable disorder of the health, without any antecedent *molimen*; in respect that the fluid which escapes is serous, very slightly colored, and does not coagulate; in that it is very small in quantity, terminates in two, three, or four days, appears at the ordinary epochs of the menstrual flux, and that, far from debilitating, it is, on the contrary, followed by an improved state of health, and greater freedom in the exercise of the functions; while the very opposite circumstances are observed in a real hemorrhage. But, in looking a little closer at the subject, it is soon found that these characteristics are for the most part quite illusory. In the first place, it is a fact that, in many women, the menses are frequently preceded by the same symptoms as the most dangerous floodings, and that the blood of the menses, far from being fluid and colorless in all cases, is, on the contrary, sometimes charged with crur and very coagulable; besides, flooding is not always accompanied or announced by the general signs heretofore indicated; it may be very moderate in the beginning, and formed of serous blood, or blood charged with fibrin, and coincide with one of the catamenial epochs; indeed, as the mechanism of menstruation is the same with that of metrorrhagia, I do not see that it is possible to distinguish the one from the other by any special signs. Moreover, this differential diagnosis leads to nothing; while the flow is slight, the precautions prescribed by art are incapable of interfering injuriously with the menstrual function; and as soon as the blood escapes in sufficient quantity to require more active interference, it would be almost ridiculous any further to seek to discriminate between menorrhagia and metrorrhagia.

3. *Internal hemorrhage* at the present day comprises four varieties. In the first, the blood breaks the membranes, and is thrown out on their interior; the second, taking place only after labor, need not occupy us at the present moment. The third, which has as yet attracted the attention of only a small number of

practitioners, although not very rare, is characterized by the retention and accumulation of blood in the vagina. M. Fleming gives three cases, and Wetherell has collected two others; I have myself observed it twice, and Pezerat has published one case which seems to me to belong to this kind; but it is seldom that it is long in making its appearance externally. Although possible during labor or pregnancy, it is after labor that it is met with most frequently. In the fourth, admitted by Mauriceau, De la Motte, Levret, Baudelocque, and Merriman, who have related cases of it, the blood tends to accumulate between the placenta, or membranes, and the corresponding part of the womb; a lenticular coagulum might in such case form with variable rapidity, depressing the ovum in an eccentric manner on the one hand, and on the other compelling the uterus to distend mechanically, so as to receive the fluid that is effused. I am aware that, in presence of facts, argument ought to be silent; but then, those facts ought to be incontestable, well noted, and properly interpreted. Now can these conditions be recognized in a majority of those that have been mentioned in favor of internal floodings? Is it quite certain that the blood, in some instances found betwixt the placenta and the womb, had accumulated there during life, rather than immediately after death; that that which escaped in torrents, as the membranes gave way, was not effused beforehand in the interior of the amnios? How, indeed, can we conceive that the blood which escapes from the uterine vessels in somewhat considerable quantities is capable of dilating beyond measure, and almost instantaneously, the cavity of the womb, instead of running between the gestative organ and its contents, so as to escape outwards, or of rupturing the membranes and becoming effused within their cavity? How can we admit that the adherences of the placenta, which are habitually so weak, could resist the effort of the blood, tending to form a new cavity for its own reception, more powerfully than the uterus, which yields with so much difficulty? If some of Baudelocque's observations do not allow us to deny this fact absolutely, and if one of the cases related by Balme is not less conclusive, we cannot say as much of the greater portion of the others which have been reported. In the observation of Saumarez, blood was effused upon the outside, and the pint and a half of this fluid, which was said to have been found between the placenta and the womb, was not enough to account for the death of the patient; the same remark is applicable to the case given by Albinus; and Ingleby, who cites another reported by one of his friends, is not the less disposed, notwithstanding the assertions of Denman, Barlow, and Merriman, to participate in the opinion which I defend here with Rambotham. In fine, then, the blood escapes externally after having separated the membranes, or else it tears the ovum and is poured out into the cavity of the amnion. If it remains between the placenta and the womb, it cannot accumulate there in sufficient quantities to form a dangerous hemorrhage, unless as a rare exception. It should in all cases be accompanied with the same symptoms as external hemorrhage, from which it should be distinguishable only by the absence of blood flowing externally, or by the unnatural size of the womb or abdomen.

4. *Flooding, with implantation of the placenta over the cervix.*—According to Rigby, flooding produced by the attachment of the placenta in the vicinity of the orifice, ought to be of extremely frequent occurrence, for, in one hundred and six cases, he met with it forty-three times; and Madame Lachapelle goes so far as to say that uterine hemorrhage, occurring in the last three months of pregnancy, depends almost upon no other cause. Burns, who is not so exclusive, does not hesitate to maintain that two-thirds of the profuse hemorrhages proceed from the insertion of the placenta over the os uteri, and that the other third depends on the attachment of this body in the immediate neighborhood of the orifice. According to him, those which do not require delivery depend only on the detachment of some other parts of the ovum. It happened, however, that, in a case which terminated fatally, the blood was furnished alone by the

cervix. Be this as it may, this kind of flooding is distinct from other species, in that it never takes place before the fifth month; that the blood at first flows in small quantity, and stops of its own accord, to reappear in greater abundance after a week or two; that it pretty often comes on without any assignable cause or precursory symptoms; that it returns after shorter intervals, and is in greater abundance as the stage of pregnancy is more advanced; in that during labor the blood flows especially during the contractions, and not in the intervals, as in the other species. When it commences early, as the blood flows in small quantity, the woman becomes exhausted but slowly, the muscles become cedematous, the face is bloated, the lips grow pale, and the skin soon assumes a dull yellow tint—the color of wax—through its whole extent. These, however, are only rational signs, which may even not be met with near the commencement of the flooding. Whenever, therefore, it becomes desirable to remove all doubt upon the subject, recourse should be had to the touch. The orifice is, in general, very soft, and somewhat dilated; instead of the membranes, a spongy body is felt, engaged, as the point of a cone with a large base might be, in the upper part of the cervix; but care should be taken not to mistake a coagulum of blood for the placenta, and, in order that the operation should not be performed unnecessarily, to recollect that this exploration may possibly reproduce the hemorrhage, by disturbing the concretions by means of which the economy had succeeded in suspending it.

Instead of following the course that I have just indicated as the most general, the hemorrhage sometimes pursues a very different one. M. Duparcque has seen a case which came on as early as the sixth month, which ceased spontaneously, and did not return until the appearance of the labor. M. Désormeaux has met with it once in the fifth month; and it became so profuse in the sixth, that it was found necessary to deliver the woman. I have seen a case where it did not appear until the end of the ninth month, in a woman to whom I was called by M. Baroilhet, and where it did not become serious until the approach of her confinement, although the centre of the placenta was situated over the orifice. We find a number of analogous facts in the older writings. M. Duparcque, who has collected some of these, explains them by saying that then the retained placenta moderates the dilatation of the os uteri, or yields without laceration; but I have proved above, contrary to what Smellie says, that the placenta may be extensively separated without the necessary occurrence of a hemorrhage, and consequently, that the circumstance indicated by Duparcque, although taking place in reality, is useless in most cases. In other cases, especially in first pregnancies, and where the uterus is very much inclined in front, the os uteri is sometimes so little opened, and so high up, that the blood may accumulate below it, to a certain amount, and in some sort produce an internal hemorrhage.

5. Did the *flooding* depend upon the rupture of some of the vessels of the placenta or cord, it would be characterized by causing the sudden death of the fœtus, and by debilitating the mother secondarily. Moreover, it would doubtless produce, as in cases where the blood is effused into the interior of the membranes, a feeling of weight in the pelvis and hypogastrium, with dragging in the loins, the groins, and about the pit of the stomach. That which collects in the vagina, so as to distend it, brings on, besides the signs of every internal hemorrhage, pains in the uterus, tenesmus, frequent desire to urinate, and gives the sensation of a considerable weight in the fundament.

C. *Prognosis*.—The dangers that follow in the train of uterine hemorrhage necessarily vary according to a multitude of circumstances, according to the species and amount of the flow, the stage of the pregnancy, and the ability of the prescribing attendant. In the early stages of pregnancy, it is rare for the woman not to be saved, for abortion is nearly an invariable consequence of it. In the last three months, on the contrary, the life of the child is pretty frequently preserved, while that of the mother is exposed to much greater risks.

Upon this subject it may be established as a general rule, that, for the woman, the danger is the greater as the pregnancy is the more advanced, and that the converse is true in respect to the child. Sometimes, the contrary is observed. In abortion, the flooding by repetition may become dangerous; it became so abundant in two women between the second and third month that their lives were in imminent danger. Carrier speaks of a patient who was taken in the third month of her fifth pregnancy, in whom the hemorrhage recurred at the fifteenth, nineteenth, and twenty-seventh days, so as to give rise to great alarm. Dance cites another, on the contrary, who, having a hemorrhage every six days after the fourth month, was however delivered of a living child at full term at the Hospital Cochin. I have related some analogous facts in the article on abortion, but they are exceptions which do not invalidate the rule. External hemorrhage is always less redoubtable than internal; because in the latter, the evil, when discovered, is often beyond the resources of art, while it is easy to recognize the former from its very commencement. Where the flow takes place from the cord or placenta, the life of the fœtus is more seriously menaced than that of the mother, and *vice versa* as to uterine hemorrhage, properly so called. When the flooding is frightful, so as to furnish ten pounds of blood in the space of half an hour, as Kluykens says that he has observed, the danger is extreme; but it rarely reaches such a degree during labor. If, although moderate, it proved suddenly mortal in a case communicated by Bryant, it was because of the occurrence of a rupture of the heart.

The danger is not to be estimated by the quantity of blood that is lost, but rather by the effect produced by it upon the system in general. There are women, who, other things being equal, are led to the verge of the grave by the loss of a pound of blood, while others lose double or triple the quantity without being seriously incommoded by it; and it is not requisite for me to say that those who are strong, sanguine, and robust suffer from it less than such as are lymphatic, weakly, and anemic.

Even although we should be so fortunate as to allay the storm, and prevent the death of the patient in a case of profuse flooding, there would still be reason to dread relapses that would become more and more dangerous, general or local infiltrations, chronic inflammations of the womb, peritoneum, pleura, and pericardium, and nervous affections of all sorts; as to the dangers of the moment, they are estimated by the severity of the symptoms under notice at the time. While ever the debility is not great, while the pulse retains some strength and hardness, and the color of the skin and features of the countenance remain without any too evident alteration, the flooding need not excite our alarm; on the contrary, there is not a moment to lose where the face grows pale, the extremities become cold, the sight dim, the pulse weaker, tremulous, and irregular; finally, but little hope remains where lipothymia, syncope, and convulsions supervene.

Notwithstanding that the death of the fœtus is one of the ordinary consequences of hemorrhage occurring in the first four or five months of pregnancy, and that at later stages it becomes most generally necessary to empty the uterus, it would, however, be wrong to conclude that a happier termination of it can never be obtained.

Indeed, all observers have remarked, that slight floodings, especially those occurring in the first stage of pregnancy, when arrested by a well-understood mode of treatment, sometimes permit the ovum to continue its evolution, and the fœtus to live and grow until its natural term. The blood has been seen to flow even to the extent of exciting fears for the woman's life, and yet abortion not to take place. Barbant speaks of a woman who kept her bed from the fourth to the commencement of the ninth month for a hemorrhage, which recurred from time to time, who was delivered, notwithstanding, of a living child at term. I attended a young lady who was seized with a profuse hemorrhage in the third month her second pregnancy, who lost more than two pounds of blood in the space

thirty-six hours, and notwithstanding did not miscarry. M. Désormeaux mentions another case, where the blood flowed with such force that it was necessary to have recourse to the *tampon*, and where the pregnancy, nevertheless, went to its full term. A case still more remarkable is ascribed to M. Cursbam. A woman, who was struck on the abdomen, was attacked with flooding at six months; the hemorrhage appeared frequently during the seventh, and with so much violence that nearly four pounds of blood escaped at one time; but the delivery did not take place until full term, and the placenta was inserted on the fundus of the uterus.

D. *Terminations*.—Uterine hemorrhage appears to be equally frequent in all countries. In a total of 4189 cases, M. Pacoud mentions forty examples of hemorrhage. It is cured in three ways:—

1. The blood that escapes externally sometimes becomes itself the remedy of the evil it constitutes, disengorges the uterus, destroys the *molimen*, removes the congestion, and permits the equilibrium to establish itself naturally: here, the flow may have been effected at the expense of the cervix, the vagina, or the inferior portion of the womb, and may not have destroyed the principal adhesions of the ovum, which remains uninjured, and thus is but slightly disturbed in regard to its development; or the placenta, although partially detached by the blood that exudes from its external surface, continues to resist, the hemorrhage stops, and, as in the other cases, the child's life is preserved.

2. In other cases, the flooding, after it has continued for a longer or shorter time, ceases; the ovum, although detached and more or less altered, is not expelled, and remains in the uterus for a period that is variable.

3. It most frequently happens that the contractions of the uterus are brought into play, and in these cases, we can rely only upon abortion, delivery, turning, or the forceps, to save the patient from dangers with which she is threatened.

Puzos has maintained that, when the flow is once arrested, the parts may contract new adhesions: a case by Noortwyck, that of his own wife, has been supposed to confirm this opinion; but, upon careful reflection, numerous doubts soon occur to any impartial and unprejudiced mind as to the value of this fact.

According to Pasta, whenever the union of the ovum with the womb is destroyed by the flow of blood, it is impossible for it to be re-established, and when abortion, or labor, or at least the death of the fetus, does not follow flooding, it is because the hemorrhagic excitement takes place in some part beyond the limits of the placenta.

The following is what observation has demonstrated: while the blood is endeavoring to glide towards the os uteri, a more or less extensive portion of the placenta or anhistous membrane becomes fully saturated with it: first one clot forms, then a second, then a third; and these several layers, of various thickness, soon become sufficiently numerous, provided the energy of the hemorrhagic affluxion becomes diminished, to exert such a degree of pressure as to retain the blood within its own vessels. It is not by stopping up large openings, by filling large vascular trunks, but by being plastered against the pores of the womb, that coagula are enabled to suspend a hemorrhage—the same mechanism by which they succeed in putting a stop to epistaxis, when they accumulate within the cavities of the nose.

Provided these coagula are not very extensive, the ovum continues to live, like a tree from which one or more of the roots have been removed. The fluid part disappears by means of imbibition, and the fibrinous layers becoming drier and drier, and less and less evident, remain, sometimes, until labor takes place, although the points which they separate are not re-united.

At the *Maternité* at Tours, I saw a young woman who was thrice seized with slight flooding, at intervals of a fortnight, in the last two months of her first pregnancy. There was nothing peculiar in her labor; but there were found, on the surface of the placenta, three distinct layers, about the size of a three livres piece; one of these layers, which was very near the edge of the placenta, was

composed of a clot that was still red, of a lenticular shape, and with difficulty separable from the after-birth; the second was composed of a fibrinous concretion, much firmer, and scarcely colored at all; the third looked more like a sort of cicatrix. Is it not evident that these three points corresponded to the seat of the three hemorrhages that had taken place antecedently to the occurrence of the labor?

I think, then, with Mauriceau, Leake, and Dewees, that the placenta, when partially detached, can remain in the womb. This opinion, which seems to be participated in by Ingleby, is further strengthened by numerous alterations which the external face of the placenta presents among some women who even go to term and are delivered of living children. The ossific depositions which cover it in the cases of Monro, Gooch, Durbon, Merriman, and Döring—the bloody masses which Dupasquier calls *scirrhus*, which Martin and Moreau have pointed out, and which I have often also observed—did not prevent some of the children from being born alive and even vigorous. It is the same with the false membranes of which Ryan speaks, the purulent deposits, hydatids, and some other lesions mentioned by Brachet. We also find mentioned in a journal a case of twins, which were born alive and well developed, in which the placenta contained many steatomatous masses, some of which were in a state of suppuration. Leveieux says, also, that, in the case of a woman who died of pneumonia during labor, and who had been threatened with abortion, an old clot of blood was found upon the placenta.

E. Treatment.—It may be said with truth that the uterine hemorrhages of pregnant women are diseases which require, on the part of the practitioner, the greatest coolness, knowledge, and skill; indeed, in presence of such accidents, a few seconds, more or less, often decide as to the life or death of two beings equally dear. Such are the cases where it imports us to know how to choose the remedy and apply it properly, and where a distrustful timidity might become equally fatal with imprudence and rashness.

The means to which we can have recourse are extremely numerous; some of them are, to a certain extent, applicable to all cases indiscriminately, and others are to be employed only under peculiar circumstances.

1. Refrigerants.—Rest, low diet, a horizontal posture upon a hair mattress, rather than upon a feather bed, in a chamber which ought to be darkened rather than too much lighted, quiet and not noisy, cool and well ventilated, rather than hot and close, with diluting or cool acidulous drinks, very frequently suffice, when early recourse is had to them, in moderate cases of hemorrhage. White relies much on the horizontal position, and the absence of all effort; while Clarke thinks that hemorrhage may be prevented by keeping the woman cool during labor. Small pieces of ice, or ice-water, internally, are very much praised by Evans; and, according to Burns, cold is more efficacious than anything else, for it favors the coagulation of blood in the vessels themselves, and, according to him, takes the place of the ligature. Ollivier pretends that he has seen flooding cured by cloths dipped in cold water, in the case of a woman who was near aborting in consequence of a putrid pleurisy. The success which Trevigno is said to have obtained, by the cold douche on the epigastrium, in hemorrhage after abortion or labor, is not supported by sufficiently conclusive observations for me to recommend his practice. I will even remark that cold, employed injudiciously in such cases, is not without danger, for it may become the cause of metritis and of every kind of inflammation. A woman, mentioned by Pezerat, who submitted to it died of peritonitis; and different authors have given similar results. If the woman is strong or sanguine, and especially if there have been precursory symptoms, if there are rigors, and the state of the pulse warrants it, six or eight ounces of blood may be drawn from the arm.

When these slight succors do not succeed at once, and where there has been no precursory *molimen*, and the woman is naturally weak, we have recourse to

revulsives and to external refrigerants. We prescribe manuluvia, either simple or containing mustard, dry friction of the arms, the breast, and along the spine, and apply large cups to the breast. In a case of hemorrhage with atony, Stoltz succeeded with the application of a blister over the hypogastrium. Aspersions are made upon the abdomen and inner part of the thighs with cold water, either alone or with the addition of vinegar, ether, or ammonia. Compresses wetted with the same liquids, or with iced water, may also be applied to the same parts. Founded on certain experiments of Lapira, a Sicilian chemist, Companyo-Lanquin maintains that a solution of subcarbonate of ammonia, applied over the hypogastrium, is an excellent hemostatic.

Burns praises the effect of alum. Duncan and Rigby seem to have derived great advantages from the use of opium and sugar of lead (acetate of lead), which had previously been recommended by Etmuller and Hayghton, and frequently employed by Dewees. The digitalis is also recommended by many of the English physicians. But these various articles are rarely made use of in France. The small number of experiments which I have made induce me to believe that alum and opium especially should not be despised; and we may also, with reason, resort to the acetate of morphia from which Fabre really seems to have obtained good effects. Rhatany, whether in decoction or extract, symphyllum officinale, bistort, the syrup of quinces, and stag's-horn are of the same kind. Others have advised the application of a tight ligature on the thighs. The disturbance in the circulation which follows, and to which Robouham and Bourgery have lately called attention, allows us to calculate on the efficacy of this means; and we should be wrong in rejecting it because Leake and Hamilton used it for the restoration of the menses.

2. The *secale cornutum* should be tried also in flooding during labor. By inducing the expulsion of the ovum and the contraction of the womb, it ought, naturally, to put a stop to hemorrhage; but what I have said before does not allow me to recommend its use unless the labor is very far advanced. Before the seventh month, or in abortion, since the child is not viable, no inconvenience will result from its use when the *fausse-couche* is determined upon. In the last two months, on the contrary, it may cause the death of the child while attempting, fruitlessly, to arrest the flooding. The practice of Chevreul and Ollivier, the observations of Kimbell, those of Doumerc, and the two examples published by Delaporte, do not change my opinion upon this point; and I persist in thinking that the ergot is not applicable in uterine hemorrhage, so long as we expect to save the child, unless when the labor is well advanced, and when the head of the child is low down in the cavity of the pelvis.

3. *Sinapisms*.—A practice that seems to me to deserve the attention of practitioners is the application of a sinapism between the shoulders. I have made use of it often enough, and in cases sufficiently various to enable me to affirm that it is one of the most powerful and most useful revulsives that can be recommended. MM. Groleau, Laroche, Nivert, and several young physicians who had seen me employ it, or put it in practice themselves, have already made mention of it in their theses. I have elsewhere stated the anatomical and physiological considerations by which I was led to its employment. I resort to it both in the first months of pregnancy and during labor, as also in the interval betwixt these periods; and the effect has always been extremely prompt. A young woman, nineteen years of age, was brought to the *Clinique Externe* of the School of Medicine towards the close of 1825. She was about three months gone with child, and had been flooding for twelve hours. We tried the remedies indicated above, but the flow continued nevertheless to increase until evening. Being then alarmed by her extreme weakness and the appearance of approaching syncope, I applied a mustard cataplasm to her back. In a quarter of an hour the diminution of the hemorrhage was evident; it soon became a mere draining, which continued until the next day, when the ovum was expelled.

There ought to be nothing surprising in such a result, when we reflect with what ease people in the country sometimes put a stop to epistaxis by placing a key, or some pieces of linen, or the like, wetted with cold water, betwixt the shoulders, and with what rapidity sympathetic irradiations are brought into play by the action of mustard. Nevertheless, it would be unreasonable to think that the action of this medicament is infallible, and that it ought to be employed in all cases. Reason indicates that it would be injurious rather than useful where the flooding is attended with a general reaction of the system, and the symptoms of the hemorrhagic effort continue in full force. Both in pregnancy and during labor, as the placenta is to a great extent detached, and its expulsion is inevitable, it might serve to diminish the impetuosity of the affluxion. But there would be little wisdom in relying upon it to completely suppress a hemorrhage that had already become serious and alarming.

4. The *ascending douche* has also been used on the lumbar region, but it requires too great a movement to be used when there is an abundant hemorrhage. Goupil, Martinet, Des Landes, and Carrère, especially, say they have derived decided advantage from the *nitrate of potassa* in doses of one, two, three, four, and six drachms a day. Others, and Porta especially, pretend that two grains of tannin every two hours form an excellent remedy. *Strychnine* has also been proposed; and *savin*, recommended by Wedekind, Gunther, and Feist, who, with ʒij of the powder, ʒij of the extract, and ʒj of the oil, made pills of three grains each, of which they administered four, five, or ten three times a day, has found some partisans in France; but it is doubtful whether a plant so acrid will ever enter into general use. When the hemorrhage is at all intermittent, we may, as recommended by Lobstein, try the *quinine*. A remedy which formerly enjoyed a great reputation, and which Viardel praises especially, is the *tincture of cinnamon*; and if we can believe Kempfen and Boer, is still used with great success at Vienna, and it may be tried without any inconvenience. *Musk*, which Hauff gives in six-grain doses every quarter of an hour, would be both too irritating and inapplicable.

5. *The tampon*.—Doubtless one of the first ideas to occur to the mind upon observing a flow of blood from the womb, was to stop up the orifice of that organ. If we may confide in Leroux, the tampon is an heroic remedy, which is almost always followed by success. According to the modern classics, on the contrary, it is rarely a useful, and most frequently a dangerous remedy, and ought to be proscribed from sound practice. Amongst others, M. Demangeon, who has been well combated by M. Gardien, has expressed himself strongly against the tampon, which, in his opinion, can only serve to augment the dangers of the disease. Specious arguments, as that of James, who rejects this means, because in a case where the placenta itself acted as a tampon in the vagina, there was an enormous hemorrhage, theoretical prejudices, exceptional cases generalized, and false reasonings, comprise, notwithstanding, all that has been brought to bear against the innumerable facts that have been reported by an infinite number of authors.

Millot commits a great error and distorts the facts, when he says that Leroux lost five of the seven women in whom he used the tampon. Indeed, Leroux remarks that Hippocrates, Moschion, Paulus Egineta, and F. De Hilden, spoke long ago of the tampon; and that Tricœn, Smellie, and Ranchin employed a kind of astringent pessary in its stead. It is certain, at any rate, that it was used at the time of De la Motte; for this author accused the midwife of having caused the death of a patient by plugging up the vagina with a towel to arrest flooding. Portal employed bits of linen dipped in oxyerate: but no one has spoken with so much precision of the tampon as Hoffman. G. De la Tourette is one of the authors who, after Leroux, has dwelt most upon its efficacy, even in hemorrhage following labor. M. Nægèle has also used it.

It ought not upon this account to be said that it never can be injurious. The tampon, like all important therapeutic resources, is a weapon of protection in the hands of a skillful practitioner, but it may become a murderous one in those of an ignorant person. For example, it would be imprudent to make use of it at the commencement of a flooding before the symptoms of plethora have been dissipated, or where the blood is being effused within the interior of the membranes, with the uterus in a state of inertia; for in such a condition it could not fail to augment the excitement, or, by retaining the blood in the womb, favor the indefinite distension of the parietes of that organ. Nevertheless, it has not as yet been very positively demonstrated, that even here it would not be more frequently useful than hurtful; reasoning, which accords with a pretty considerable number of facts, leads me to believe, along with M. Chevreul, that it affords, perhaps, one of the surest means of forcing the uterus to contract or arouse it from its lethargy; this is the property, even, which renders it redoubtable where we are fearful of facilitating the expulsion of the ovum, and which makes it improper to resort to it until after we have ascertained the inefficacy of other modes of treatment. Burns, with reason, proscribes it when the woman is very feeble, because then it is necessary to empty the womb as soon as possible. We will see, moreover, in the article on the delivery of the placenta, the plan which should be practiced after the delivery. Eight observations reported by M. Charey, as well as my own, and those of Gallandat and Kok, prove that in abortion and in placenta prævia none of the inconveniences attend its use which have been ascribed to it. Stewart, who disapproves of it, and Ingleby, who places little confidence in it, have resorted to it too seldom for their opinion to be of any great weight.

Reason seems to indicate, at first, as MM. Man and Demon think, that in the positions of the trunk, and when the placenta is over the opening, the tampon does scarcely any good, because the head, the breech, the back, or the shoulders, alone may furnish a sufficient *point d'appui*; but as, before the rupture of the membranes, the part which presents is forced into the os uteri at the moment of each contraction, we may count on a similar point of support, and there is, consequently, no proof that the tampon does not suit in all presentations of the fœtus.

It is composed in very various ways. Many persons content themselves with filling the vagina with tow, lint, old linen, or sponge. Dewees says it is never necessary to carry the tampon as far as the os uteri; there are some who prefer a small bag, or sort of purse, filled with astringent substances: but the simplest method, which also is that adopted by M. Désormeaux, consists in making a kind of sac with fine linen, well greased with cerate, and which is introduced empty as far as the os tincæ, to be afterwards filled with little rows of lint or tow, or some such substance, and then secured with a T bandage. The oil in which Burns advises us to soak the tampon appears to me to be of no other use than to favor its introduction. Vinegar and oxyerate, recommended by others, are of less doubtful value, although their styptic action is soon annihilated by the coagula, and by the flow of the blood. Moreover, it is a mechanical barrier, and not a pharmaceutic substance, by which we attempt to oppose the hemorrhage. A handkerchief, with a piece of ice wrapped in it, is not less convenient; and Burns, who recommends it, thinks it useful in increasing the coagulation of the blood, which, according to Blundell and Tackerach, is already favored by the hemorrhage itself. It is a real stopper, which, by closing up the passage to the blood, compels it to coagulate by little and little, and, as it becomes concrete, to compress and shut up the exhalant orifices that furnish the fluid; on the other hand, by its quality as a foreign body, it excites the cervix, and changes the vitality of the womb, whose contractility it arouses, and whose reaction it recalls, to such a degree as soon to occasion the expulsion of the ovum.

If it is to succeed, the blood ceases to flow from the vulva, the general symp-

toms are gradually allayed, the hypogastrium becomes more firm without increasing in size, and provided the womb is not to be emptied, the woman only experiences a feeling of tenesmus, straining, and weight in the pelvis, and sometimes slight colic pains; while, in the opposite case, pretty smart pains and real contractions of the womb supervene; in consequence of which, the clots, the tampon, and the product of the conception are all expelled, one after another, from the genital organs.

In some women it is followed by such a degree of uneasiness, even although there may be no uterine contractions, that they insist upon its being removed. In general, their entreaties should be resisted, provided no evidences of internal hemorrhage are discovered, unless, indeed, the pain is so acute as to give rise to certain nervous affections, or convulsions. Complaints in these cases are rather to be desired than feared. After some time the functions are seen to return to their natural state.

In order to avoid the risk of a return of flooding, the tampon is left *in situ* as long as possible, at least for several hours, or even a whole day. When it is no longer considered to be indispensably necessary, the T bandage only is removed, for the tampon being no longer kept in the organs by an external force, escapes spontaneously and gently, unless it is removed.

Thus, in labor, as in abortion, the effect of the tampon is to repress the hemorrhage and to induce the expulsion of the ovum. We need not then here resort to it, as there is no necessity for it, or since it is not necessary to retard the labor.

6. *Compression.*—Bandaging the belly may be added to the tampon, and employed even as a preventive means from the commencement of labor, with all women threatened with flooding. It is a means, the more valuable, as it does not prevent the use of any other. Large and graduated compresses over the iliac and hypogastric regions, and fixed by a bandage or towel, may be soaked in cooling or styptic liquids without preventing internal medication, or the employment of the tampon. If we may believe Ingleby, Dr. Gaistkell, who employed it for forty-five years, had never seen a case of fatal hemorrhage in seven thousand deliveries. McKeever, who, with Labatt of Dublin, used it since 1815, and employed compresses of a kind of cushion, says that, of six thousand six hundred and sixty-five women treated at the infirmary in 1819 and 1820, there were twenty-five cases of hemorrhage, none of which proved fatal. Dennison, who described it in 1784 or 1785, and N. Hill, who says that he has used it for a half century, have not prevented Walford from claiming it of Searle in favor of Ramsbotham and Davis. But, as Lannyon says, the idea is so wanting in novelty, that it may be found in the work of Paré; and Leroux, who traces it to Dussée, Puzos, and Levret, speaks of a surgeon of Dijon who had advised it. Denman speaks of the great success obtained from linen dipped in vinegar, and strong compression on the hypogastrium. Baudelocque has not passed it by silently, and Millot, who believes that he invented it, maintains that he had practiced it in 1773 in presence of the *sage-femme* Leroy; that he published his success in 1798; that without it the tampon of Leroux could not have been successful; and that the square compress, which he prefers, should be dipped in vinegar before being applied to the hypogastrium.

Thus, this method, which dates beyond our century, has in its favor a great amount of testimony. Deventer and De la Tourette also advise it.

Stoltz has often arrested hemorrhage by forcibly compressing the uterus against the right side of the pelvis; and Hueter used with advantage a sack of sand applied over the hypogastrium for the purpose of compression.

7. *Dilatation of the os uteri, and rupture of the membranes.*—Before proceeding to forced delivery, Puzos recommends the trial of a practice which is, in his opinion, much more simple, and particularly much more consonant to the nature of the organism. Introduce, says he, first one, then two, then three fingers into

the orifice, which you should titillate and irritate, but very gently; and you will often find that this alone will suffice to stop the hemorrhage, and to induce the womb to contract. If this does not suffice, begin to dilate it, enlarge it with all the care and gentleness that the severity of the symptoms will admit of your using, and if you still do not succeed, perforate the membranes, and the vacuum that will take place in the membranes will rarely fail to be followed by the expulsive contractions of the womb. You will have, it is true, a premature delivery, but which will be less dangerous both to the mother and to the child than if the practitioner had undertaken to deliver the fœtus.

This conduct is particularly adapted to cases where hemorrhage takes place during labor, or where the pregnancy is very much advanced, and the placenta is not attached near to the neck. Stewart, Hamilton, Burns, and Dewees, who have opposed it, seem to dread all of the accidents which belong to a premature rupture of the membranes, especially inertia, and too prolonged contraction of the womb directly on the fœtus; but we have seen above upon what such fears are founded; and Ameil justified the practice at the commencement of this century, when he recommended Puzos's plan, at the same time insisting on the titillation of the os uteri and frictions on the abdomen. Ingleby, who preferred it to every other application, maintains, with reason, that, after having broken the membranes, the head should be pushed up so as to allow the waters to escape; this precaution forces the uterus to empty and retract on itself, and prevents the blood from collecting in the interior. Burton, who performed version in a case which had been in the hands of a midwife, found an enormous clot behind the child; the tampon appeared to him to be less advantageous, even when the placenta is over the os uteri, or a little to one side, because then the descending head arrests the flooding. Cusack has seen it succeed in six different cases, and Merriman has used it successfully thirty times in the last month of pregnancy; indeed, Rigby and Blundell mention fifty or sixty successful examples. Millot, who is in favor of it, directs that the ovum should be punctured with a *trois-quarts*, and Holmes has devised a stilet for the express purpose; but, as the finger almost always answers, no one recognizes the utility of such instruments. On the whole, the rupture of the ovum is a powerful assistance in cases of flooding; its efficacy seems to me to be greater than that of the tampon, when there is no necessity to retard the escape of the child. Mauriceau and Dionis, who long ago employed it, were fully aware of its value. Notwithstanding, it is evident that, with the exception of the rupture of the membranes, the tampon fulfils pretty nearly the same indications as Puzos' plan, and that, where the flooding is violent, it would be wrong to act with so much reserve, and not to terminate the delivery as soon as possible.

8. *Forced delivery.*—When a labor proceeds with a certain degree of regularity, notwithstanding the hemorrhage may continue, and the powers of the woman may diminish too rapidly, it generally suffices to accelerate the contractions as has been mentioned, and to engage the woman to keep up her courage, and use her best efforts to enable the womb to get rid of its contents, as well as to put a stop to the flooding. Provided, on the other hand, the infrequency of the pains does not permit him to rely upon the powers of the economy, the accoucheur should hasten to deliver the child. If the head be already engaged in the superior strait, and the os uteri sufficiently open, and *à fortiori*, if it have already reached the excavation, it should be seized with the forceps; otherwise, the child should be turned; but, in order to admit of the hand being carried into the womb, the orifice must have reached a certain degree of dilatation, or at least be in a very dilatable state. Therefore, it is only in the last stages of pregnancy, and where nature or the means heretofore pointed out have forced the labor to begin, that we may resort to this method, which is particularly applicable to cases of hemorrhage from implantation of the placenta over the cervix uteri. Happily, when there is a flooding, the orifice is commonly very soft, and admits of a ready pas-

sage. Moreover, it is manifest that, where the danger is pressing, it would be better to make use of some violence in overcoming the resistance, than to abandon the woman to the so frequently fatal chances of an overwhelming flooding. Forced delivery, in cases of flooding, is a very old method, the inventor of which is not exactly known. Louise Bourgeois, to whom the honor has been ascribed, and who wrote in 1608, indeed recommends it. But Guillemeau, who also advised it, who mentioned many cases of success, and who spoke of it as a common practice, says that he employed it in 1699, and thus saved Madame Simon, the daughter of Paré. Mauriceau, also, extols it, and complains bitterly of the surgeon who, when called to his sister, affected with a profuse hemorrhage, did not dare to practice version, but allowed her to die. There are few accoucheurs who have not since adopted it, and it is, indeed, the surest method of saving the mother and child when the period of pregnancy and the state of the womb will allow of its performance.

9. *Placenta prævia*.—The termination of the labor should never, under any pretext, be left to the powers of nature, when the hemorrhage is incontestably occasioned by the insertion of the placenta upon the os uteri. Then, says Rigby, version should be performed as soon as possible. The eight or ten lines of dilatation is not even necessary, provided the os uteri is sufficiently soft to allow the hand to enter.

In this particular case, many practitioners have recommended that, as soon as the fingers have got within the os uteri, we should try to find that part of the edge of the placenta that is nearest, so as to pass up the hand in that direction; others have thought that, in difficult cases, or, where there is no time to temporize, it would be better to neglect this minute research, and to perforate or rupture that point of the ovum that corresponds to the orifice, so as instantly to lay hold on the child's feet. The former of these two modes of practice would occupy too much time. The latter, which Guillemeau evidently recommends, when he says that the accoucheur should pierce the placenta if he cannot get round it, of which Deventer also declares himself a partisan, and which Maygrier and Halma-Grand have highly recommended lately, cannot fail very much to augment the violence of the hemorrhage by tearing the placental vessels, and to compromise gravely the life of the child, if its extraction is rendered long or difficult. Besides, the child must necessarily pass through the opening in the placenta, which, pushed down by the shoulders or head, would evidently oppose some obstacle to the remainder of the operation. The case stated by Halma-Grand is, moreover, the less conclusive as the child was born dead, and the woman herself died a few days afterwards. Levret, who has also practiced this method, and De la Tourette, who endeavored to increase its importance, have not demonstrated its advantages; and Lauverjat, who, as Clerck says, has used it, has published nothing especially in its favor.

The method followed by P. Portal is in all respects to be preferred. Without any regard to the edge of the placenta, the hand, after reaching the os uteri, is to be first carried in front, and then to the right of the woman if it be the left hand, and to her left if it be the right hand that is made use of, and in less than a second, the membranous part of the ovum is reached, and must be perforated; the feet are now promptly seized, and the fœtus may be delivered before the after-birth.* As this process is not accompanied with difficulty, and may be speedily performed, we cannot see why we should follow the advice of Guillemeau. There is, moreover, no reason why the practitioner, as recommended by

* I saw a patient in labor with placenta prævia under the care of Dr. R. M. Huston of this city. The hemorrhage, which had been very great, was arrested before my arrival, by means of a *tampon*, which he introduced. In the mean time, the pains continued to dilate the os uteri more and more until, inferring that the organ was sufficiently dilatable, he removed the tampon, and then successfully delivered by turning.—M.

Leroux, should amuse himself by pressing the separated placenta against the bleeding side of the opening, while, with the other fingers, he effects the dilatation of the os uteri.

In the other species of hemorrhage, when the turning has been effected, and the hips are at the vulva, it seems to be wise, provided there be no inertia of the womb, to leave the closing of the labor to nature, whereas, in cases of implantation over the cervix, when the operation is once begun it cannot be terminated too soon. The reason of this difference strikes us at once: in the first-mentioned case, as the omphalo-placental circulation continues to go on, the life of the child is not compromised, and that of the mother is no longer in danger as soon as the blood ceases to flow; in the second, the functions of the placenta ceasing, a few moments of delay might occasion the death of the fœtus.

In fine, the practitioner should be aware that, at all events, the woman runs extreme risk in all these cases of flooding, unless prompt delivery is decided upon. The extreme suffering which forced delivery occasions, and the sudden depletion which results, are often followed in such cases by the most complete collapse; a sad prelude to an almost inevitable death. It was thus with the sister of Mauriceau, who, abandoned by his *confères*, was ultimately obliged to deliver her himself. The same thing happened to me in a young woman who resisted our entreaties to the last, and whom it was necessary to deliver in spite of herself. There is no more painful alternative; for, if the accoucheur does not empty the womb, the woman inevitably dies; and if he does, she may perish during the operation, or a few minutes afterwards. Consience, however, requires that we should follow the latter course, which is, sometimes, happily rewarded, as we see by the case of Bourgeois, who, after more than an hour's attention, succeeded in restoring to health the woman and the child, already in a state of apparent death.

Is it necessary for me, in closing, to state that the reader must look to the articles on Abortion and Delivery of the Placenta, for the details which I cannot introduce here, and especially to what is said on Transfusion?

§ 2. OF CONVULSIONS.

The agitation, the agonies of a woman in the midst of the most violent labor pains, are sometimes carried to such an extent that to have been witnesses of them is sufficient to make us feel that such a state borders closely upon the convulsive affections, and convince us that convulsions must be frequently met with in women in labor.

The convulsions of pregnant women, like those of other women, may be general or local; affect only one or all the limbs; the face or any other part separately; or they may bring into play all the muscles of the life of relation.

Most commonly none but the muscles that are habitually subject to the will are affected. But in certain cases, those viscera which contain a muscular membrane are also seized. Thus the pharynx, the œsophagus, the stomach, the intestines, the bladder, the uterus itself, the heart, and especially the diaphragm, are at times violently tormented by them.

A. *Partial convulsions.*—*Partial convulsions* are very rare, and perhaps many of those reported as such should bear another name. There is no doubt that, with Miquel, we should not attribute the obstinate vomiting of certain pregnancies to convulsive movements of the stomach, and that palpitations to such an extent as to raise up the clothing, as Lemoine says that he has seen, do not belong, as Baudelocque maintains, to a sort of convulsion of the heart; but these phenomena are not the less generally comprised, and with reason, under other designations: it is under another aspect that partial convulsions ordinarily show themselves.

Whichever it may be, we may, as in general convulsions, make two varieties,

the tonic and clonic. The first, indeed, those which Dunaud calls *gouttes crampes*, are fixed and tetanic: the others are alternate, and accompanied with more or less irregular movements; it is in the latter that the convulsions often commence with the sensation of a ball which rises from the hypogastrium to the throat, and which is often remarked during the first four months of gestation. Although they may be met with in men, as in the examples cited by C. Broussais, and in the one which I met with, it is, as Dubois of Amiens says, notwithstanding, almost always the uterus which is the point of origin. It is by these, also, that we can explain a certain number of cases of pretended witchcraft, and of the histories of women possessed of the devil, or devoured by animals which have entered into their viscera.

1. *Of the abdominal walls.*—In certain cases, the abdominal walls appear to be particularly affected, as we see by the following observations:—

P. Dubois tells me that he has witnessed a case of very singular partial abdominal convulsions, in a woman between the fifth and sixth months of pregnancy. The abdominal walls contracted with such force that the uterus was pushed completely into the pelvic cavity, and afterwards, rising up quickly, it seemed to rebound like an elastic ball thrown upon the ground. Knots also appeared in the flanks, the epigastrium, and the umbilical regions, and seemed to depend on spasmodic contraction of the viscera as much as of the abdominal walls. This woman got well without aborting.

2. *Of the viscera.*—The viscera are frequently the seat of perverted contraction; of which the following is one of the most remarkable examples with which I have met.

A village girl, aged twenty-two years, of a dry and nervous constitution, was delivered naturally of her third child. She desired, on the seventh day, to get up and attend to her work, but pain in the lower part of the abdomen obliged her to keep in bed; on the tenth day she was frightened by certain movements in her abdomen, which reappeared from time to time, with greater intensity. I was called to examine her, and was as much surprised as the patient was. A sort of globe was seen through the integuments and muscles, which seemed to move about over the whole region of the lower part of the belly, sometimes towards the excavation, sometimes towards the flanks, and sometimes towards the umbilicus; the ball occasionally divided into a number of pieces, and passed through the belly with a noise, the walls of which retained their natural softness. The patient soon imagined that she had an animal within her, and that she was doomed to the infernal regions. She became ultimately crazy, and entered the hospital at Tours, where she died, two years afterwards, without a complete cessation of these singular movements.

The peritoneum and muscles were as black as ebony in the hypogastric region, although sound. The digestive organs presented no alteration. The uterus was, as it were, covered with small fibrous tumors; one of the ovaries was degenerated into a multilocular cyst; and it was the same with the corresponding tube.

3. *Of the vagina.*—Smellie and Plenck pretend to have seen spasms of the vagina powerful enough to prevent the exit of the child. Halma-Grand, Mondière, and Nægèle are said, it is true, to have felt the vagina contract itself to the point of benumbing the hand of the accoucheur during labor; but it is not shown satisfactorily that no error has been committed in any of these cases.

4. *Of the uterus.*—The partial spasms, which should more particularly attract our attention, are those of the womb; they have been mentioned from all time, and have been observed during pregnancy, during the time of labor, and after delivery.

a. Alphonse Ménard says that he has seen them occur *during gestation*, so as to give the uterus the form of a calabash. C. Baudelocque and Deneux cite a case where the womb was elevated and depressed, and carried from right to left

with a surprising force. Ed. Petit states that, in his case, contractions were so violent that the uterus, moved by the abdominal muscles, seemed at every moment about to be forced through the vulva, and that it was necessary to press upon the vagina to prevent its escape. Although mixed with some exaggeration, these facts have been collected by cotemporaries so well instructed, that we cannot call them in question. We may also examine that which Pacoud relates, in which the womb became the seat of a real movement and a violent agitation.

b. Spasms of the uterus, *during labor*, are more easy to understand, as, during the period of expulsion, each contraction has something really convulsive about it. Invading sometimes the whole of the organ, they, however, more frequently attack only one part. Those of the neck have been especially noticed, whether of the external or vaginal orifice, or of the internal or uterine. We should not allow ourselves, however, to be deceived by what observers have advanced concerning the spasmodic contractions of the neck before the head has arrived in the excavation; it is almost always near the body of the uterus, and not the vagina, that this cramp or convulsion exists. In this sense it is only met with after the passage of the presenting part. Mauriceau says that it was so strong in one patient, that the head of the child was pulled off, and Saxtorph has seen the same thing occur to the trunk in a case in which the foetus came by the pelvis; Smellie cites another, where it was impossible to deliver the child without emptying the cranium. Baudelocque agrees that he would rather crush the head than increase the constriction. Dubois, on one occasion, was not able to pass the hand into the uterus so as to take hold of the feet, and the use of the forceps was indispensable. A. Ménard relates a still more interesting example, in which the labor lasted ninety-six hours, and, when the head had been pulled off, the accoucheur, with very great difficulty, brought down the arm. The upper part of the neck of the uterus was applied round the thorax like an iron band, and it was only after very great difficulty that the hand reached the feet: the child was affected with ascites.

c. The *delivery of the placenta* does not prevent such a phenomenon; the retention of the placenta is one of its effects. Girard, of Lyons, and A. Ménard, have each given curious cases of it. Normal contractions existed below the stricture, but in the cyst, on the contrary, they were accompanied with a trembling, which the accoucheur detected without difficulty, and which really presented the characters of convulsion. I have myself observed many facts of the same kind, but I do not think that I ought to stop here to give an account of them, because the spasmodic or convulsive contraction which produces retention of the placenta forms a distinct accident, which we will hereafter treat of.

B. *Varieties*.—Puerperal convulsions present different shades, and have been compared to other convulsive affections. Tetanic, cataleptic, hysterical, epileptic, apoplectic, and choreaic, have been described. Merriman speaks of them only as epilepsy, and Vogel says that it is an acute epilepsy. Burns, who admits one kind from exhaustion, from fatigue, from protracted labor, and from hemorrhage, says that they take on most frequently the nature of eclampsia, and that they occur in the proportion of a hundred to one. Sauvages, wishing to make them a distinct disease, gave them the name of eclampsia, as Hamilton has since done. But Dewees, who made this the subject of a special treatise in 1818, continues, notwithstanding, to class them under these three forms: 1st, *epileptic*; 2d, *apoplectic*; 3d, *hysterical*. Fearing lest this diversity of names should cause many different maladies to be taken for the same affection, and remarking that eclampsia of parturient women comprises many conditions, which resemble each other only in the perversion of muscular movements, C. Baudelocque has thought proper to join them together under the titles of tetanus, of epilepsy, and of catalepsy. For myself, I think, with Madame Lachapelle, that the convulsions of pregnant women, and of those in the parturient and puerperal state, differ very

often from tetanus, from catalepsy, from epilepsy, from hysteria, from apoplexy, &c., and I think, with Désormeaux, it is better to retain the name of eclampsia, and not that of *convulsive dystocia*, used by Young.

Statistics more numerous, and based on a greater number of facts than belong to the domain of science, would be necessary, should any one undertake to establish the frequency, whether absolute or proportional, of *eclampsia*. Gehler says that, in 800 difficult labors, he has only seen 22 cases; and Merriman gives 48 examples out of 2000 accouchements; while Madame Lachapelle relates but 67, including 6 of apoplexy, in nearly 38,000 deliveries. Thus Ryan says that puerperal convulsions are more common in England than in France. But we see, on the other hand, by the tables of Pacoud, of Bourg, who has met with it 47 times in 11,208 cases, and those of Hart, who gives 6 in 400, that this difference is much less than might be supposed from the statements of Merriman and Madame Lachapelle. Gaitskell gives one case in 400; but Desjardins, on the contrary, gives 7 in 1000. In 3000 labors, Champion has met with it 10 times.

Nothing is then more variable than its proportions. In endeavoring to establish it on a great scale, as Riecke has done, who speaks of 22,000 cases, we would be exposed to great errors if we wished to deduce exact conclusions. So far as I am concerned, I have never seen a case of eclampsia in 1000 labors at the Hospital of the Faculty, or at my amphitheatre, while I have observed many at the *Maternité* at Tours, and at the Hospital Saint Louis, where my attention was not so carefully engaged. I will add that I have met with sixteen cases in less than 1500 deliveries in civil practice.

Perhaps eclampsia occurs more frequently in some years, and in certain conditions of the atmosphere, than in others, as Smellie has endeavored to establish. Bouteilloux, who has also remarked it, says, with Madame Lachapelle, that at the *Maternité* in Paris it sometimes became epidemic, and that one woman is seldom taken without the occurrence of many cases soon after.

The period of its most frequent occurrence is doubtless during labor; then even it is not usually at the commencement, or near the close, but in the long period which separates these two extremes, that it appears, and especially just when the head clears the os uteri.

A. Ménard is wrong in stating that convulsions only take place at term. It is more correct to say, with Chaussier, that they occur especially during the last two months; or, as Madame Lachapelle states, that they are rare before the sixth month. I have met with them at six months; at five months they are rare, and, as Burns states, those which appear before the fourth month approach too nearly hysteria to cause any alarm. A young woman at the Hospital Cochin, who was taken at four months, nevertheless died; and the same thing is mentioned by Willis. After the delivery of the placenta, they occur less frequently, since a physician, an old *interne* at the *Maternité*, told me that he had never seen one example among thirty cases of eclampsia.

This may, however, be only the effect of coincidence, for eclampsia is not altogether rare after delivery. In fine, we may judge of the different proportions from the following table:—

I. MAURICEAU.

PERIOD.	Total.	Lived.	Died.
During gestation,	7	4	3
During labor,	19	8	11
After labor,	16	11	5
During pregnancy and labor,	1		1
During labor and after,	2	1	1
Total at all periods,	45	24	21

II. MERRIMAN.

PERIOD.	Total.	Lived.	Died.	Forceps.	Version.	Cephal.
After labor,	6	6				
During delivery of twins,	3	2	1			
During labor,	24	20	4	11	4	9
Delivered without aid,	14	9	5			
Total at all periods,	48	37	10	11	4	9

Of these, 36 were primiparal. There were 17 living children, 34 dead. One died undelivered.

III. MADAME LACHAPELLE.

NO. OF CASES.	Eclampsia.	Apoplexy.	Total.	Forceps.	Version.
In 15,652,	36	4	40	12	5,
In 22,243,	25	2	27	8	
In total of 37,895,	61	6	67	20	5

Of the latter of these, 23 occurred before, and 4 after labor. Of 25 detailed cases, we find 9 deaths.

IV. PACOUD.

DATE.	Cases.	Eclampsia.	During pregnancy.	During labor.	After delivery.
In 1823,	2341	2		2	
1824,	1615	7	7		
1825,	1710	8	1	5	2
1826,	2341	16	6	7	3
1827,	3201	14	4	6	4
Total of all dates,	11,208	47	18	20	9

V. DESJARDIN.

TOTAL.	During labor.	After delivery.	Cured.
7	5	2	7

VI. CHAMPION.

BIRTHS.	Total.	Cured.	Died.	Children died.	Children lived.
All primiparal,	10	7	3	5	5

VII. VELPEAU.

PERIOD.	Total.	Cured.	Died.
During pregnancy,	7	5	2
During labor,	5	3	2
After delivery,	9	5	4
Total at all periods,	21	13	8

1. *Predisposing Causes.*—Although we observe it at all seasons, at every age, in all classes of society, and in all temperatures, it is nevertheless true that persons who are strong, plethoric, of dry fibre, of an animated countenance, of a short neck, who are abundantly and frequently regular, the nervous, delicate, irritable, those subject to nervous diseases, and young girls who are pregnant for the first time, are more exposed to eclampsia than any others.

Merriman says that puerperal convulsions depend on general irritability, distension of the uterus, or general plethora. Although more common among primiparae, as Burns maintains, it is not exclusively met with among them, as Bouteilloux would have us to understand, whose five cases belong to this order especially. Eclampsia may occur in the second, third, fourth, or even fifth pregnancy, not only among those women who have suffered in the first, as in the case of which Dewees speaks, but for the first time, and without any previous attack; and Dumont even speaks of a patient who was seized in the eleventh pregnancy.

The condition of the stomach and intestines seems also to favor the development of convulsions; it is on this idea, doubtless, that the practitioners who make so much use of vomits and purges base their practice. Many English authors are still of this opinion; the same may be said of Chaussier, who, having remarked that, during the attack, women sometimes carry the hand with violence towards the epigastrium, as if to tear it, thinks that then the stomach is very much irritated; and Miquel seems to participate in this opinion; but it is not really admissible, except in a small number of cases.

Anasarca, of the pelvic extremities especially, is another cause which should attract the attention of practitioners. When Demanet announced it at the commencement of this century, he was opposed by Fournier, because the six observations which he reported were not very conclusive. Since then, the influence of this cause has been again called into question by Miquel; it is, however, one of the most easy to establish by the examination of facts. I do not think that it is necessary to explain it by saying, with Lagarde, who adopts Chaussier's opinion, that the infiltration of the lungs during pregnancy prevents the oxidation of the blood; but, with Madame Lachapelle, I am convinced that females who are anasarcaous are very much exposed to convulsions.

To these general causes, we may add some special ones.

a. *During pregnancy.*—During the course of gestation, eclampsia is, in some sort, produced by the occupations of each day.

The important modifications which conception impresses upon the nervous system among most women, evidently predisposes them to it during the first months, only then the convulsions being almost entirely nervous, are far from presenting constantly the different characters of eclampsia. It is of these, without doubt, that Madame Lachapelle speaks, when she says that with nervous women convulsions are not followed more frequently by coma than hysteria is. It is especially in this case also that Baudelocque is authorized in maintaining that convulsions are never dangerous when they depend on a pregnancy unaccompanied with complication.

The suppression of the menses, which, necessarily, retain in the blood materials which should be eliminated, increases the susceptibility of women to different irritations. The uterus soon becomes softened, imbibes the fluids, and becomes the seat of an activity too powerful not to produce a reaction over the whole economy, through the medium of the nervous system. The vomiting and palpitations, which the least alterations cause so often, explain how the development of convulsions may be induced by it. The volume, which it acquires subsequently, becomes also a more active cause of disturbance and disease. The pressure, which the large vascular and nervous trunks of the pelvis experience, produces such changes in the circulation and innervation, that congestions and

excitement of the brain are not at all surprising. By pressing on the neck of the bladder, it may cause a variety of retention of urine, accompanied with severe pain, and may thus induce eclampsia, as in one of the cases of De la Motte or of Leake. To the sympathies which centre in the stomach, and on which De la Motte insists, we are obliged to add also the mechanical pressure on this organ, and, consequently, through it on the diaphragm, lungs, and heart; whence Ménard speaks of cramps in the epigastrium occurring during the latter periods of pregnancy. Suffice it to say that these occasional causes pervert the principles of organic life. The inanition, into which some women fall in consequence of these vomitings, is also a cause of severe convulsions, as Levret says.

b. During labor.—Eclampsia during labor, notwithstanding what Gardien says, is favored by the extreme distension of the uterus, by the difficulty which the fluids experience in traversing it, by the rigidity, hardness, and spasmodic contraction of the mouth, and by excess of sensibility of its whole surface, by the tension of the membranes, superabundance of the waters, the presence of two fetuses, malposition of the child, and all the mechanical circumstances capable of hindering or retarding labor. The irritation which causes the preparatory pains and the first expulsive contractions especially predisposes to it. At this moment, it is neither the pressure on the nerves, nor the repulsion of the fluids towards the cranium, which exposes to convulsions during labor, but, in reality, the profound alterations which take place in the functions. Attentive examination of what occurs soon shows that the pain during labor resides in the uterus essentially, and not in the nerves of the pelvis, as Leroux maintains, nor in the neighboring parts, as Girard pretends; and that the uterine contractions are really painful of themselves, contrary to the opinion of Dewees and Powers. Now, such a condition cannot occur in the organism without arousing numerous sympathies, and without seriously disturbing the principal general systems, especially the nervous and sanguineous.

c. After labor.—Immediately after delivery, the woman is under influences not less important than during labor. The quick removal of pressure from the abdomen changes suddenly the relations of all of its organs; the blood, which flowed with so much difficulty through the inferior aortic system, now flows with greater freedom, and the more so, as the viscera are the less sustained. Pregnancy and labor excite the cerebro-spinal system by repelling the fluids towards them, and the delivery interferes with the functions of this apparatus, by depriving it, too suddenly, of its natural stimulus.

Besides, the puerperal function of the uterus does not end with the escape of the ovum. A part of the liquids, which are combined with its substance, re-enter the circulation more or less altered, and those which are thrown out on its interior, and are there rapidly decomposed, may take the same course. Much more irritated in this state and bordering on disease than during its distension, this organ does not contract normally. Its reaction on portions of the placenta and membranes, or clots which may remain within its interior, produce phenomena which may last for a long time. In fine, after the disturbance brought on by gestation and labor, the equilibrium, which should naturally recur, cannot take place without impressing on the nervous force new shocks.

2. *Occasional Causes.*—Air that is impure, charged with odors, and too rarely renewed; the summer heats, too high an artificial temperature, anger, grief, vexation, some unexpected news, joy, and all vivid emotions; loss of sleep, frequenting of balls and theatres; laboring at night; the abuse of baths, of hot drinks, of coffee, tea, spirituous liquors, and spiced or highly-seasoned dishes; succulent regimen, and whatever increases the afflux of blood towards the head; coition; the suppression of an issue or any habitual discharge; the use of corsets, and too tight dresses; and want of exercise, have been ranked among the causes of eclampsia. To these have been also added the habit of lying long in bed,

atmospheric vicissitudes, and almost all the common causes which the authors never fail to recall upon the occasion of each disease they describe, those causes which seem to produce all the evils because they do not necessarily create any one of them.

No one can deny that such circumstances have sometimes produced eclampsia; but it is also undeniable that it often comes on without its being possible to assign any satisfactory reason for it.

It is quite gratuitously, it appears to me, that De la Motte and C. Baudelocque mention the presence of a boy, rather than that of a girl, in the womb during gestation as the cause. The sight of an epileptic or of a hysterical person can become a determining cause only, like any other lively emotion, through the influence of imitation.

a. During gestation.—All causes of abortion may bring on eclampsia. It is likewise liable to occur when the placenta is situated over the neck, from the hemorrhage and infiltration which often result from it. The *menstrual molimen* appears also to become a cause of it among certain women. Whether it may be under the influence of this molimen, or in any other manner, it always happens that, in the last two months especially, the uterus becomes the seat of a trembling, sometimes quite painful at the monthly periods, and that this condition is frequently accompanied by the precursors of eclampsia. This is a fact which I have often proved, and which Chaussier had already noted. Baudelocque speaks likewise of a woman whose attacks always corresponded to a menstrual period.

b. During labor.—At the moment of delivery, eclampsia may be induced by extremely variable causes: by the presence of a vesical calculus, or of a tumor, in the pelvic excavation; by a polypus or cancer of the womb; by the occlusion or abnormal coarctation of the neck. It was due to the presence of a fibro-cartilaginous growth in the superior portion of the vagina, in the patient of M. Dunaud. Persistence of the hymen, agglutination of the vulva, and obliteration of the vagina, may also produce it. It is the same with a disproportionate volume, faulty positions of the fœtus and of the uterus, the application of the forceps and version, and all tokological operations. The death of the child, even, is said to be also a cause of convulsions; but an accident which often produces them is rupture, whether of the uterus or of its neck.

c. After labor.—At the moment that labor is terminated, convulsions are occasionally induced by abundant uterine hemorrhage, though I have met with it only twice. Inversion of the womb, then, is one of the most common causes. In Mauriceau's case, there was hemorrhage, and the inversion involved only the fundus of the organ, which was depressed like the neck of a vial.

A very speedy labor may cause them to occur; and nothing produces them more frequently than retention of the placenta or some portions of it. On this account, M. Bouteilloux goes even so far as to participate in the fears of De la Motte, and thinks that the presence of some foreign body in the uterine cavity is the most common cause after delivery.

Without denying that *metritis* cannot also produce them, I nevertheless do not hesitate to say that it is not a frequent cause, either during gestation, during labor, or after delivery. This disease presents itself with a different order of symptoms from those which usually precede the appearance of convulsions. When we see eclampsia appearing suddenly in a woman robust and of good constitution, it is difficult to suppose a pre-existing metritis, which should, according to Krimer, be an indispensable condition. The six examples with autopsies, which this author reports in corroboration of his opinion, already noticed elsewhere by Autenrieth, should only be received, then, under the title of simple coincidence.

C. Symptoms and Progress.—The attack of eclampsia is, in some women, announced by various precursory symptoms, such as flushes of heat about the

head, giddiness, confusion of ideas, hallucinations, indisposition to move, uneasiness in the limbs, a dull or frightened look, redness of the conjunctiva, or of the whole countenance, headache, vertigo, stammering, vivid brightness of the eyes, irregularity of the pulse, slight convulsive motions of the muscles of the face, subsultus of the muscles of the extremities; but it is often, also, found to appear in a sudden and unexpected manner, and to attack at once with the most alarming symptoms.

D. *General History*.—These precursors have, therefore, been erroneously regarded as constant by Deleurye and Dewees. The pain in the head, upon which this last author insists so much, and which Puzos and Hamilton remarked before him, has, nevertheless, been very frequently observed. A woman, says he, who uttered the cry "*Oh! my head! my head!*" was taken with convulsions, and died in a few hours. That which Ménard advances in regard to apoplexy should apply also to eclampsia. It matures during gestation, says he, and only bursts forth towards the end. A woman, who had had wandering pains, like cephalalgia, since the sixth month, and who was successfully delivered, was seized with apoplectic convulsions on the third day, and died on the sixth.

Denman and others have attached much importance to pain in the stomach. Convulsions, which thus announce themselves, will be even worse, according to him, than those which begin with pain in the head. I have also noticed these two symptoms among many women; but they are wanting with the greater number. It is, moreover, singular that Chaussier and Madame Lachapelle, who made observations in the same establishment, have each expressed a different opinion regarding the frequency of the precursory signs of eclampsia; the first of these authors asserts, in fact, that they almost always exist, and the second says that they are often wanting.

Some women experience a sensation of weight, hardness, and even of pain, in the hypogastrium, some weeks, some days, or only some hours before the accident. This is a sign which I have met with three times very distinctly, and which has not sufficiently attracted attention. If the hand is placed over the uterus, across the walls of the abdomen, it will often be found in a sort of tonic contraction, tightened up, and sensitive to the least pressure.

The woman suddenly becomes insensible, and seems to revive for a moment only to fall again into the most violent agitation. The limbs writhe, contract, become flexed and extended with astonishing strength and celerity; the body is bent backwards, as if the head and heels were about to approach each other, which actually touched in a case seen by Baudelocque. The hands are powerfully directed towards the breast or the epigastrium, which they strike, and sometimes appear to tear with rage; the features of the face become distorted and *convulsed*; the lips, which are drawn in various directions, move in the most singular manner; the eyes roll, are agitated and turned up under the orbits; the pulsation of the carotids and temporal arteries is seen through the skin; the jugulars swell; the throat and face become tumid, and almost purple; the eyes seem as if they would start out of the head; the mouth fills with water, which is spirted sometimes to a great distance upon the assistants; the tongue, irregularly agitated, is often pinched, and even violently bitten by the grinding of the teeth and the spasmodic motions of the jaws. In these terrible moments, the woman is truly a frightful object, and highly deserving of pity; the diaphragm by its rapid contractions gives rise to sobs, and an appearance of suffocation, and forces from the mouth and nostrils the substances accumulated in them. The stomach and bowels, the bladder and uterus itself, when they become the seats of such motions, produce vomitings, involuntary expulsion of the feces and urine, and sometimes of the ovum, with an extreme promptitude; in fine, it might be said that all the viscera participate in the disordered movements of the limbs. At other times, the face and the rest of the body pass, so to speak, with the rapidity

of lightning, from this state of agitation and vivid color into the most perfect calm, and fall into a mortal paleness; at last, and more or less promptly, the congestion of the brain brings on coma, which generally succeeds the attacks of syncope and insensibility.

The duration of an attack is not less variable than its intensity; it lasts in some cases only from ten minutes to a quarter of an hour or half hour; whilst in others it continues half a day or even twenty-four hours. If coma supervenes, it may prolong the insensibility for several days, and terminate in a complete and prompt restoration to health; but it is also found to assume all the characters of apoplexy, and occasion the death of the patient.

Most often, the fits are multiple: the one which is to follow, is very often indicated, say Croft and Merriman, by a very decided feeling of weight. I have noticed, like them, the existence of this remarkable phenomenon.

A rapid winking of the eyelids, repeated movements of the under jaw, injection of the countenance, bending and extending the head; afterwards contortion of the limbs soon follows, and is succeeded by a state of torpor generally longer than the first time, and which disappears either definitively, or to give place to a new accession; I have seen these fits even assume all the characters of apoplexy, and cause death.

It also sometimes happens that certain of the functions remain in a perverted state after the cessation of the convulsions; sometimes the sight, or hearing, or smell, or some one of the intellectual faculties appears to have suffered the severest pressure of the disease; at others, there are found internal lacerations or particular effusions, that occasion a deviation from the natural state of the organism. M. Burns speaks, according to Finney, of a patient who, in this manner, produced a luxation of the jaw.

When the woman comes to herself, fatigued and worn out, her limbs bruised, as after long and violent exercise, astonished at the situation in which she finds herself, she is, sometimes, ignorant of everything that has taken place, can scarcely believe what is told her, and has no knowledge of the extraordinary movements executed by all parts of her frame, or the violent cries she has uttered; some are mentioned, even, who have been delivered without knowing it, and, after the attack was over, could not understand that they were really delivered!

On the parts that have been struck with considerable force we afterwards find blackish spots, which are real contusions, attended with more or less pain.

E. Termination.—Eclampsia terminates either by restoration to health, by death, or by generating another disease.

1st. *Restoration to health.*—When a cure is about to be effected, the fits are more and more retarded; and, if they return, they are less and less prolonged. The drowsiness, torpor, and coma are dissipated by degrees, and the woman seems as if awakened from a long dream.

2d. *Progress and death.*—On the contrary, if the head becomes more and more confused, if the attacks augment in intensity and length, if the comatose symptoms predominate over the convulsive phenomena, death is to be feared. It comes, moreover, after a very variable duration. Denman cites a woman who died at the end of thirty-five minutes. That of M. Schedel did not survive twelve hours; and Hamilton's was taken at nine in the evening, and succumbed at ten o'clock the next morning, although she had been pregnant only eight months. Chaussier has seen one perish from it in twenty-one hours. One of Dewees' patients resisted for a few hours only, and that of Shaw died in thirty-four hours, although she had lost eighty-two ounces of blood: but then it is probable that an effusion had taken place in the brain, or that some lesion had occurred.

It is well to remark, finally, that eclampsia has frequently produced a dilata-

tion of the os uteri, as Malacarne relates an example, and Hamilton has made known another. M. Deneux seems even to admit that, most frequently, ruptures of the uterus depend upon a partial convulsion of that organ. This last termination can only take place during pregnancy; the apoplectic termination may show itself as often after labor as before. It is thus, without doubt, that death took place in the woman of whom C. Baudelocque speaks, and who, six weeks after her confinement, was taken with convulsions in the evening, and died suddenly that night. In fine, I agree with Deleurye, who consequently makes a lacteous apoplexy, and with Miquel, that eclampsia terminates less frequently unfavorably after than before delivery, although Astruc and Tissot have pretended to the contrary.

The violent *raptus* which takes place in each fit towards the head renders it reasonable to imagine that the cerebral substance is more or less affected: and also that eclampsia is very often the starting-point of those lesions which eventuate in mania, in softening of the brain, and in different sorts of paralysis. One of the women treated by Merriman became mad, and died some weeks after in a new attack. De la Motte cites one who remained paralyzed in the limbs; in one of the patients of Mauriceau, the muscles of the tongue were alone affected in this way, and in another case there resulted a simple amaurosis. Amand speaks of a woman who was confined, and afterwards recovered with loss of memory. Some retain an almost perpetual cephalalgia.

The accumulation of the fluids in the viscera, and the rough and unequal pressure which the convulsive movements produce, expose the patients at the same time to a number of congestions and inflammations. Madame Lachapelle says that many women attacked with eclampsia die of peritonitis, and M. Ciniselli has published a fact corroborative of this assertion.

A fat girl, who, without being pregnant, experienced many violent attacks of eclamptic convulsions, remained completely paraplegic after one of her fits. A patient whom I saw with Baron Larrey retained a numbness almost amounting to paralysis in one limb for six weeks.

It is even possible that inflammations may supervene after some days in consequence of the medication employed. The lady of whom I am about to speak has given proof of this. She was taken, the second day of her convalescence, with a violent erysipelas over the entire surface of the leg, from the application of sinapisms to the part, which had at first produced no effect. Désormeaux recounts a case nearly parallel: the skin did not commence reddening until the third day after the removal of the rubefacient cataplasms. This is a circumstance which will be met with very often, and which it is worth fixing the attention upon. I see no reason why it may not be the same in the interior of the body, if the mucous membranes, scarcely irritated during the fits by the remedies administered, are liable also to become the seat of an inflammatory reaction when the excitement is calmed.

F. Prognosis.—The prognosis of eclampsia is in general unfavorable, both for the mother and for the child. As Hunter says, he fears only hemorrhage and convulsions during labor.

1. *On the mother's side.*—By the acknowledgment of the chief midwife of the *Maternité*, in spite of the most rational and skillful treatment, death has occurred in nearly half of the cases. Lauverjat pretends that the Duchess of Beaufort died of it. Hunter and Lowder say that it kills more than half, and M. Dubois considers it more dangerous than hemorrhage. If we can believe Parr, six or seven out of every ten women are lost; Jacob even pretends that they all die. Ryan gives only a third. A glance at the table which I have given above will prove that these proportions are not at all exaggerated. Nevertheless, I do not believe, with Madame Lachapelle, that, when abandoned to itself, eclampsia would

be uniformly mortal, nor, with Gehler, that we can save twenty-one out of every twenty-two cases.

Less grave, all things being equal, during than before labor, it is so much the less so as parturition is more and more advanced at the moment of the first fit. As emptying the uterus is often the sole means of putting a stop to these accidents, it is evident that the danger of convulsions will be in direct proportion to the dangers and difficulties attending it. If the neck of the uterus and the head of the fœtus, for example, are disposed in such a manner that it may be easy to extract the child, the disease will be less troublesome than if the orifice were still hard and not effaced: it is this last state which renders it so grave during the last three months of pregnancy, because nothing announces the preparatory steps of labor. Some women recover from it then nevertheless, and are afterwards delivered of living children and at term. MM. Gasc and Landré-Beauvais have each made known a conclusive example of it. We find another in the memoir of Ciniselli; the woman, aged seventeen years, in convulsions for a month, was, nevertheless, delivered of a fœtus, which has continued to live, whilst she, after the cessation of the eclampsia, succumbed to a violent metro-peritonitis. Then the fits are neither very violent nor very frequent. Otherwise, the uterus must either empty itself, or the woman perishes. If the female is able to go to term, it is possible, nevertheless, as Levret and Lauerjat have remarked, and as I have also seen, that labor occurs, with the disappearance of all unpleasant symptoms.

During labor, eclampsia is sometimes terminated by a rapid expulsion of the child. Gardien cites a case where the delivery was completed in three pains. I may even remark, with Chaussier, that the uterus then remains in a state of almost permanent contraction, and that this contraction redoubles with each fit; so that the convulsions influence it, in fact, in the same manner as ergot of rye. I nevertheless hasten to add that the convulsions, in this case, seem only to be those which proceed from the uterus.

Those which show themselves in hysterical women, epileptics, females of great nervous susceptibility, or who are constitutionally predisposed to these two affections; those in whom the fits are short, or separated by well-marked intervals of calm, and the re-establishment of all the functions, are less formidable than those which have no connection with any previously existing nervous condition of the woman, which occur among sanguine or plethoric individuals, or among those whose organs are all surcharged with serosity. The convulsions accompanied by apoplectic phenomena, by coma, and by stertor or entire loss of consciousness during the intervals of the fits, are extremely grave. It is the same also with those who have symptoms of organic disease, more or less chronic, either in the brain, lungs, heart, or some other important organ, and which the pregnant state has more or less decidedly aggravated.

2. *On the infant's side.*—The infant runs still more danger than the mother. In the first place, it often dies in the midst of those extraordinary movements which characterize each fit. Whenever abortion occurs, it cannot survive; it is ordinarily the same even when premature labor cannot be avoided; and in forced deliveries, at term, the fœtus also frequently perishes. Nevertheless, it is not accurate to say, with Deleurye, Boer, and Désormeaux, that serious convulsions in pregnant women almost always involve the death of the child. Three or four fits are not sufficient to destroy it, as Lemoine thinks. The death of the child ordinarily takes place during pregnancy, as M. Dugès says, but that leads us to infer that it cannot be delivered or extracted until a long time after the appearance of the disease. During labor, on the contrary, it is very often preserved, both because it is sometimes expelled spontaneously without much difficulty, and because we can extract it with the forceps, or by version, before it has ceased to live. It may survive, says Ménard, if delivery is prompt; otherwise it dies.

In fine, I do not believe that its death, in such a case, may be, as often as C. Baudelocque appears to think, the result of the efforts which are made to extract it.

G. Pathological Anatomy.—The examination of the body after death is far from always giving a satisfactory explanation of the severity of the symptoms. There may be a small quantity of serum in the ventricles of the brain; the veins and sinuses of the brain may be more or less engorged; the meninges and cerebral substance may be somewhat red, or of a natural appearance; in some cases evident traces of congestion, or a slight extravasation of blood exist; but, most generally, no appreciable lesion is what Merriman found within the cranium. Neither have the other splanchnic cavities exhibited any alterations, that constantly occur in these cases; the heart is flaccid, and almost empty; the lungs are engorged or pale; and a few ounces of citron-colored or reddish serum in the serous cavities are the principal alterations which Denman has noticed. He asserts, nevertheless, that after delivery the abdomen has presented to him various evidences of inflammation. Hewson, Hooper, and Ley have, however, each related an example of effusion in considerable quantity within the cranium of women who have died of convulsions.

M. Bouteilloux, who reports a number of autopsies, says that he has never met with any manifest alteration. M. Cruveilhier, whose testimony cannot be challenged upon such a subject, affirms that, in one case, the vessels were not even engorged. Madame Lachapelle holds the same language; she formally asserts that, if apoplexy is not complicated with it, the organic alterations are not at all in proportion to the intensity of the attacks. A little serous fluid in the ventricles, and a doubtful engorgement of the blood-vessels, constitute what she has most frequently met with. We see in her second observation that there was effusion of serum into the cerebral ventricles, the pleura, and the pericardium all at the same time; but this seems to be the effect, rather than the real cause, of the disease.

C. Baudelocque remarks likewise that eclampsia often leaves no lesion appreciable on the dead body; that the whole may be reduced to a sanguineous engorgement, to serous effusion into the ventricles, and to some pre-existing organic lesions, and that we must search for the cause of the evil in an undefinable nervous condition. Ciniselli says positively also that he has found nothing peculiar either in the spinal marrow or brain of the patient whom he examined.

It does not follow, however, as we have already seen, that blood is never found effused in the brain. In addition to the examples of it which I have mentioned above, it would be easy to add to these some others. In a woman who died of convulsions during labor, Targioni found the left ventricle full of blood. Marchais has examined one who died fifteen days after delivery; a clot, the size of a hazelnut, existed near the petrous portion of the temporal bone in the right hemisphere of the encephalon, and the cerebral substance was softened around. The right ventricle was also filled by a clot of black blood in the subject of Madame Lachapelle's first observation; it was also the same in that of Leloutre, and in that of Schedel. The optic thalamus and corpus striatum were as if studded with little clots, in one of the subjects of whom Menière speaks. Lastly, there was an enormous effusion into the ventricles in a case the examination of which Pinel Grandchamp has communicated to me. I cannot omit to add, however, that these observations all relate to cases in which apoplexy preceded or complicated the eclampsia, and not to puerperal convulsions, properly speaking.

The peculiar alteration of the dura mater, noticed by Baudelocque, which he speaks of only from a single case, is not, and cannot be, of any importance; so that pathological anatomy teaches us nothing in reality concerning the nature of eclampsia. The spinal marrow has not been sufficiently examined in similar

cases for us to be assured that it may not possibly be the seat of the disease, as Powel, who attributes eclampsia to a transmission of action from the uterus to the nervous centres, seems to suppose, and Burns, who thinks that the irritation is transmitted from the uterus to the spinal cord by the intermediate hypogastric nerves. The slight lesions, remarked by authors, in the thoracic and abdominal cavities appear to me so insignificant that I do not think it necessary even to discuss their value. I have already spoken elsewhere as to what we should believe regarding the traces of metritis which Autenrieth and Krimer pretend to have observed.

H. Treatment.—A disease exhibiting itself under forms so diverse, and in such various degrees, cannot be cured by a treatment that is alike in all cases; it is, therefore, not astonishing that we have so many boasted remedies for it. There are few substances among the antispasmodics, the sedatives, the narcotics, the revulsives, and the antiphlogistics, which have not had their vogue.

1. *Special treatment.*—Besides general medication, eclampsia requires also the employment of some other resources, according as it exhibits itself during pregnancy, during labor, or after delivery.

a. During pregnancy.—The eclampsia which comes on during pregnancy can scarcely be subdued except by one or the whole of the means already indicated. It is then that antispasmodics, prolonged hot baths (which Gondinet extols particularly), sedatives, purgatives, digitalis, and alteratives are often useful. It was during pregnancy that the women of whom Mauriceau and De la Motte speak were bled forty-eight, eighty-seven, and even ninety times. Premature labor, forced delivery, and vaginal hysterotomy may also be applicable during the course of this period; but it is at the time of labor that their value should be especially inquired into.

b. During labor.—Delivery is the best remedy for puerperal convulsions. This fact cannot be contested. Mauriceau, who was convinced of it, directs its accomplishment as soon as possible. This is also the opinion of Portal; and Amand says that both mother and child perish if delivery is not promptly terminated. Dionis holds the same language, but believes that it does not always do away with the difficulty. Guillemeau has already said that, under these circumstances, it is necessary to deliver immediately; and this is also the opinion of Madame Ducondray, who condemns the practice of throwing cold water in the face, and recommends bleeding in the neck. Deventer proceeded in the same way. Lemoine wishes no other remedy, and Deleurye expresses himself exactly in the same manner. This is also the advice of Roederer, and especially of Aitken. We see also that, according to Puzos, the most certain remedy for violent convulsions is to deliver the woman if it is possible. Bruhier d'Ablincourt remarks, with Dionis, that, although the only remedy, delivery, nevertheless, does not always succeed.

Accoucheurs are then, we may say, unanimous upon this point, and A. Ménard repeats again that we can only calm convulsions during labor by disembarrassing the uterus. This is a practice, nevertheless, the utility of which Ross, Denman, Baudelocque, Gartshore, and Gardien himself, have since called into question.

Burns is almost of the same opinion; and Hull thinks also, with Hamilton and Leake, that it should not be considered applicable except in cases in which the convulsions originate in the uterus. De la Motte does not wish that anything more than a general rule should be laid down. According to him, it is not proper even to avail ourselves of this extreme remedy, until nothing more is to be hoped for from nature. For my part, I entirely agree with the opinion of Mauriceau, and I think, with Ménard, that there is not much besides emptying the uterus which is likely to arrest the progress of eclampsia developed during labor. It is true that the evil is not always removed, and that many

women also die from it afterwards. Witness one of the patients of M. Gasc, and another of M. Teallier, who, although delivered promptly with the forceps, succumbed a short time afterwards. But we can reply that we must either have recourse to delivery very soon, or else, as Ménard remarks, the brain at once becomes the seat of a profound alteration.

I will add, finally, that, in following this course, Desjardins has not lost a single patient out of seven, and that Champion has saved seven in ten.

The assistance to be rendered in such a case is, besides, very various:—

1st. *To await spontaneous delivery.*—If the head has descended, and the neck be effaced, if the uterine contractions appear frank, and the labor seems to be advancing with some speed, we must wait and restrict ourselves to general means. There is no pressing necessity for action, especially if the convulsions are hysterical or dependent upon great nervous excitement, and at all times when they are separated by completely lucid intervals. If, on the contrary, the uterus does not act, if it is a case of apoplectic eclampsia, if labor is advancing too slowly, and the violence of the accessions excites fears either for the mother or for the child, there must be no hesitation; we should hasten to terminate the labor as promptly as possible.

2d. *Secale cornutum.*—After the numerous trials which have been made with the secale cornutum, when it is of importance to excite the uterine contractions, it was natural to employ this substance also in eclampsia occurring during labor. Waterhouse and Ashwell say that they have had recourse to it with real advantage. M. Adrien also pretends to be very much pleased with it, and invokes in its favor an observation which cannot be received as conclusive. I do not think, however, that this is a case in which we can calculate upon its efficacy. At the commencement of labor, before the neck is completely dilated, ergot will evidently add to the dangers which threaten the fœtus, whatever Parent may say of it. When the head is in the excavation, the forceps are more available, and version would be preferable if dilatation was simply effected, the head not having passed the strait.

3d. *The forceps.*—In cases of convulsions, the forceps, which Levret almost always substituted for version, is an instrument so much the more precious from its permitting the certain and prompt extraction of the child without compromising the situation of the woman. Accordingly, there are few moderns who do not follow, upon this point, the doctrine of Levret, Barbaut, Mackenzie, and Meriman. Unfortunately, the utility of this instrument is restricted within very narrow limits; it is necessary that the child should present by the head, and that the neck of the uterus should be completely dilated, if not cleared. Duchâteau has published six cases to prove that we can have recourse to them even when the occiput is still at the superior strait, and Miquel says that this is A. Dubois's doctrine also. But I shall beg leave not to adopt this practice, although M. Champion tells me that he has likewise followed it once with success both to the mother and child. The forceps are not preferable when version is not too difficult, from the greater chances which the latter affords of preserving the life of the child. But, in convulsions, our object should be, above all things, to save the mother, and the fœtus demands so much the less attention from the fact that it frequently dies before we can decide what should be done. Without being extremely difficult, the application of the forceps at the superior strait is, nevertheless, more embarrassing, and requires more time, than version. It is, then, when the head is strongly engaged across the opening, and especially when it is in the excavation, that they are almost exclusively applicable. It is at this stage of labor that Teallier, Gaide, Maygrier, and so many others, have employed them with success, and that I have thought proper to have recourse to them myself.

4th. *Version.*—So long as the head is free above the superior strait, we should

not, and, indeed, cannot, if the neck is only half dilated, extract the child except by version. If the first stage of labor is accomplished, if the orifice is dilated, or distensible enough to be passed by the hand without too much difficulty, this operation has nothing here peculiar in it. But, if the eclampsia co-exist with a spasmodic obstruction, induration, or some disease of the neck, indeed if the labor is yet at its commencement, or has not yet begun, it is either impossible or, at least, extremely difficult. First of all, it is necessary to have the passage clear.

5th. *Premature labor.*—The means proposed to force labor to declare itself before term should, it seems to me, as V. Horn also wishes, be tried in eclampsia of pregnant women, and with greater reason when the affection continues until the neighborhood of term, when no symptoms of labor exhibit themselves after the first accession.

If it is true, as Levret advances, and as I have witnessed on my own part, that labor usually puts a stop to convulsions which occur during pregnancy, we cannot deny that premature delivery may be attempted in eclampsia which threatens to become grave before labor has actually set in. Lauerjat seems to have made use of this resource. "If the convulsions persist," says he, "and there is little or no dilatation, I slip the finger up between the uterus and the membranes, to separate them in the least possible degree. We thus put a stop to the accident by the relaxation of the uterine fibres."

This method, which I do not hesitate to advise, the same, moreover, that Hamilton has proposed and adopted in a great number of instances for bringing on labor in cases of deformity of the pelvis, deserves, in my opinion, the particular attention of practitioners.

6th. *Rupture of the membranes* should be tried afterwards, if the convulsions persist. Mauriceau frequently acted thus during the first half of labor, and M. Gras, who declares himself its advocate, reports two observations in defence of the plan. Whether before or after the accession of labor, we obtain by it a diminution of the uterus, a vacuum which may be of very great assistance, the importance of which Lauerjat has perceived. It may be feared that, in case of failure, version may be rendered more difficult subsequently in consequence of the pressure of the uterus upon the child, but the results furnished thus far by premature labor, and the observation of M. Dumont, have sufficiently responded to this objection.

7th. *Forced dilatation.*—To enter by active force into the uterus is another resource which has also found its defenders. Ashwell, for example, believes that we are able, almost always, to dilate the neck with the fingers; and Ryan, as well as Osiander, prefers this gradual dilatation to incision of the os uteri, so extolled by Bodin. The practice has been abused, I think, by both sides. When the neck is not the seat of any disease or spasm, it is not generally very difficult to overcome the resistance, and, on this account, the instrument for dilatation invented by Barny appears to me completely useless. Nevertheless, as, to succeed, patience and gentleness are requisite, and as great excitation and an irritation capable of augmenting the convulsions, result from it, I do not know, even then, if it would not be better to have recourse to incision. In a woman whom I delivered with M. Fournier, I forced the neck, which was hard, although thin, and as large as a half crown piece. I reached the uterus, it is true, but, from the severe pain occasioned by it, I am induced to think that it would have been much better to incise the orifice.

These are, however, the only circumstances favorable for the employment of forced dilatation; for, if the cause that arrests delivery is either a deviation, an adherence, a scirrhusity, or a coarctation of the neck itself, it is altogether useless to attempt it.

8th. *Incision of the os uteri.*—Incision of the mouth is the last remedy which

I have to propose. This idea is very ancient. When the os uteri offers any real difficulties to its dilatation, A. Paré directs us to incise it. Fournier has invented an instrument for the express purpose; and Mesnard speaks of it likewise. This method is also a matter of examination in the commentaries of Van Swieten, and in the work of Barbaut; but it is to Lauverjat, Bodin, and Coutouly that we are indebted for its having been rendered generally known. Lemoine clearly recommends this incision when the hardness of the neck resists bleeding; and Dubosc, of Toulouse, had already practiced it in 1781. It was opposed, in the Academy of Surgery, by Allan and Piet. Since then, it has again been the object of severe criticism. Bandelocque goes so far as to assert that it can only be the result of a moment of delirium, although he considers that it may be useful when the fibres of the neck are dry and too hard. Bouteilloux and Madame Lachapelle have likewise proscribed it, and think it very dangerous, especially on account of the extension which the wound may take along the uterus. The four observations of Coutouly prove that they are deceived upon this point.

The incision of the uterine orifice in such a case is neither very dangerous nor very formidable. Dupuytren has often practiced it with advantage in cases of voluminous polypi. I have seen M. Jules Cloquet, at the Hospital of the Faculty, practice it upon a young woman whose labor was too tardy, and who was scarcely conscious of it. Delpech does not hesitate to advise it in convulsions with spasms of the neck. Champion has practiced it once with success by making an incision on either side, in the case now under consideration. Lebreton has also had recourse to it with success in a case of cancer. Godemer, meeting with a hard tumor, which occupied two-thirds of the neck, cut it freely, and brought on labor. He afterwards excised the diseased parts, and the woman recovered in eight days. There are few first labors in which similar lacerations do not take place. Facts without number, besides, place the safety of the operation, at the present time, beyond doubt.

The operation is simple and easy: in order not to make too deep a wound, it would be better to make a number of incisions, like Coutouly, Moscati, and almost all those who have had recourse to vaginal hysterotomy. As the neck is greatly thinned during labor, and as it ordinarily presents a disc of from one to two inches radius, we may really incise it to a considerable extent without apprehension. I think, then, with Miquel, that this incision is too much neglected, or usually put in practice with too much timidity by practitioners of our day.

If, in place of the neck, there should be a pierced diaphragm, or a membranous crescent, which opposes delivery, as in the example which I have related, and as in another which Stone cites, we shall be obliged, likewise, to incise it.

The patient of whom Dunaud speaks was in this situation. The convulsions did not allow the practitioner to temporize. A pair of scissors, guided by the finger, enabled him to divide the fibrous crescent, and the woman recovered perfectly. In my own case, the bistoury was preferred, and no accident resulted from it.

If the vagina itself is obliterated, as in the example published by Lombard, we must still find some way of getting at the fœtus. The woman succumbed, it is true, in the case of the physician of Geneva, but because the uterus was ruptured.

9th. *Cæsarian section*.—In case eclampsia depended upon an irremediable contraction of the pelvis, we shall, also, have to decide whether or not it would be proper to practice the Cæsarian operation.

I shall confine myself, at this moment, to repeating that this last operation tends essentially to the preservation of the child, and that, in convulsions, the fœtus is often born dead, even when we have delivered it by the natural passages.

10th. *Cephalotomy* is another resource which should be preferred to the

Cæsarian section, so much the more, as, by the *céphalotribe* forceps of A. Baudelocque, it will be possible to extract the head thus without much danger. In England, where perforation of the cranium is so freely practiced, they often decide upon it, although there may not be any deformity of the pelvis, and Meriman thinks he is acting quite boldly in advising us not to make use of it too often. In France, we have fallen into the opposite extreme, and it is not uncommon to see the mother sacrificed to the desire of preserving the child.

c. *If the woman dies without being delivered*, a last resort yet remains to endeavor to save the infant. The fetus must be extracted, as if the mother were living, by the vagina, if there be no obstacle, or by abdominal hysterotomy in the opposite case; but in such an instance, we must calculate but little upon success, even should the operation be speedily performed; for, as Peu remarks, the death of the mother, at this time, is immediately followed by that of the infant. I know not even whether Lauerjat is not right in asserting that the child always perishes before the woman. The fact is that the four Cæsarian operations which this author practiced, under these circumstances, resulted in the death of the children. In every case, it would be better to incise the neck, as Lebreton wishes, than to open the abdomen.

d. *After labor*.—If delivery of the placenta be not accomplished, we must hasten to complete it when convulsions come on after labor. As eclampsia then depends upon the sudden depletion which results from the operation, a too abundant loss of blood, rupture of the neck of the uterus, or perineum, or the presence of clots, or some other foreign body, within the womb, it is not the less important to extract the after-birth as soon as possible.

During the first hours, we experience, on this account, no difficulty. The parts remain soft enough to enable the hand, during a pain, to reach for the placenta and extract it; but, by the beginning of the following day, it is no longer so. Nevertheless, the indication is precise: there should be no delay. Without agreeing with Bouteilloux that the convulsions which manifest themselves after delivery depend, almost always, upon the presence of clots, I will willingly admit that it is very often the case. I have witnessed one example of it with M. Evrat, and M. Vasseur has communicated another to me. Burton goes even farther. He pretends that small sanguineous concretions, arrested in the uterine sinuses, cause the gripings and colics of women recently confined; and wishes, for this reason, as Bouteilloux recommends, in order to relieve eclampsia, that we should carefully empty the uterus of whatever may be contained within it.

Compression on the hypogastrium, emollient injections, narcotics, detergents, or antiseptics, according to the supposed cause of the evil, and direct treatment of the lesions of which the pelvis may have become the seat, are the only special remedies which our art possesses against convulsions after labor. As in other cases, all varieties of medication may be applicable to them.

2. *Résumé of treatment*.—Ether, balm water, orange-flower water, and mint water, mixed in various proportions with infusions of linden flowers, wild poppies, orange leaves, lettuce water, &c., and with some sedative syrup, are not to be neglected in a number of cases where the convulsions have more analogy with hysteria or epilepsy than with apoplexy, especially if the patient is nervous, very excitable, or lymphatic rather than plethoric and sanguine. In these cases, also, the syrup of clove pinks, of white poppies, of diacodium, pills of cynoglossus, the extract and tinctures of opium, may be usefully given, either alone, or added to the above-mentioned vehicles, or under some other form, and combined in some other manner.

Camphor, so much extolled by Hamilton, should likewise be tried. As the state of the patients does not always permit them to swallow, the physician frequently has no other resource than to administer these medicines to them per anum, by injection. Ipecacuanha, prescribed by Plenck, in the dose of half a

grain, with three grains of sugar, every quarter of an hour, may be employed in the same way.

Rigidity, scirrhus induration, and spasmodic contraction of the os uteri, being sometimes the only, or at least the principal cause of convulsions, we ought not to omit to examine it carefully. Provided that it should seem to be the point of departure for the disease, we should apply to it some of the opiate cerate from which M. Schweighæuser asserts that he obtained very successful results, or, what is better still, the belladonna ointment. Were it really too hard to be overcome by the efforts of the womb, I do not see that it would be possible to dispense with incising the neck. Upon this subject the fears of Madame Lachapelle are, to say the least, exaggerated: for I have not learned that the passage of the head, after this operation, has in any case enlarged the wound, so as to perforate the peritoneum. However, notwithstanding what has been said by M. Bodin, it is a resource not without danger, to which we should not under any pretext resort, except in case of indispensable necessity.

Bleeding has always enjoyed much favor among obstetric physicians: Mauriceau, De la Motte, Puzos, &c., have repeated it six, eight, ten, seventeen, and even as many as eighty-six times in one pregnancy in the same woman! The loss of blood is always useful where there are signs of congestion about the head, a strong pulse, or any signs of plethora. The blood is sometimes drawn from a superficial vein, sometimes by means of leeches or cups, and at others by all these means together. Except where there is some particular counter-irritation, we commonly begin with a general bleeding of six, eight, ten, twelve, or even fifteen ounces, according to the severity of the disease, and the constitution of the woman. After this first venesection, if it appears to produce some amelioration, it is repeated a second time, a third, or even a fourth, at intervals more or less considerable, always remembering that in this way the strength of the woman is rapidly exhausted. When the general bleeding can no longer be repeated with the hope of obtaining any decided advantage from it, leeches may be applied to the number of fifteen, twenty, thirty, forty, or fifty, behind the ears, or on the neck, or even in the neighborhood of the vulva, provided there should be any appearances of irritation or evident congestion in the pelvis. Should the coma be very profound, and blood not be got except in very small quantity, scarified cups on the nape of the neck, or on the mastoid apophyses, ought also to be tried. As to bleeding from the temporal artery, or even from the radial artery, proposed by some persons, I do not think that it deserves any preference over venesection: but which vein ought to be opened?

In the prevailing theory of blood-letting, bleeding in the foot passes for being essentially revulsive, while bleeding from the neck is rather derivative, and that from the arm merely depletive; but these distinctions are scarcely justified by practice: Baudelocque has seen bleeding from the saphena aggravate the affections that were invariably diminished by opening a vein in the arm, and other practitioners have observed the inverse. In eclampsia the object is to disengage the vascular system, and when bleeding is deemed necessary, I think it matters little whether it is taken from one vein rather than another. If the cerebral congestion is fixed and too great, should the opening of the jugulars appear to be indicated, leeches or cupping might be regarded as preferable, considering that bleeding in the neck is not always an easy nor even practicable matter, especially in a person laboring under convulsions.

Another reason of the same kind will long continue to render bleeding in the arm much more general than bleeding in the foot; it is always, or most always possible, no matter how agitated the patient may be, for us to open a vein in the bend of the arm, whereas as much cannot be said as to the veins of the leg: by bleeding in the arm, we act at the instant we please, and how we please, and we take much or little, and that without any difficulty. By bleeding in

the foot, on the contrary, various preparations are required; we must take advantage of a moment of calm, the vein is often found to be too small or too deep-seated, and it frequently happens that enough blood is not obtained.*

Tepid baths allay irritation, whether sympathetically by their soothing action on the skin, whether by diminishing the exciting qualities of the fluids by the water which they occasion to pass into the circulatory system, or by diminishing the force of radiation of heat. They are administered with success where the symptoms of apoplexy do not predominate; but they ought not to be prescribed until a bleeding has been premised, provided the state of the patient is such as to admit of her losing blood without danger; otherwise it might favor the affluxion and congestion in the brain; they should be rejected in cases depending on flooding, a serious plethora, and where there are any threats of inertia: the woman may remain immersed in a bath for half an hour, an hour, or even longer, according to the relief she derives from it.

The application of *cold water* to the belly, according to the recommendation of Sigaud, has not a sufficient number of facts in its favor to enable us to recommend it in this form as a general proposition. Ablutions, and ice-water to the head, either used alone, or while the rest of the body is plunged into a hot bath, which Denman and most of the English authors, as well as A. C. Baudelocque, Madame Lachapelle, &c., have boasted so much of, appear as if they might indeed be usefully combined with the other rational means where there is reason to fear a lively reaction in the brain; nevertheless, their employment seems to me to require a great deal of prudence and circumspection.

Oil or *irritating* injections of all sorts are frequently used in England, and not without success. In France, they prefer external revulsives, sinapisms, or sinapised cataplasms, to the feet, legs, or thighs, a large blister on the back of the neck, and dry frictions along the spine, and on the limbs. Madame Lachapelle, who does not place much confidence in them, and is even afraid of them where there is a threatening of inflammation in any one of the organs, also rejects the employment of digitalis and camphor, to which Hamilton attributes very great virtue, and blames the conduct of our transmarine neighbors, which consists in a recourse to purgatives and even to emetics, after bleeding. Without charging myself with the defence of the accoucheurs of Great Britain, I cannot, however, omit to observe that, out of twenty-two women treated by bleeding, calomel in purging doses, neutral salts given by the mouth or by injection, and lotions made with liquid acetate of ammonia or spirit of rosemary, to the head, Merriman lost only six, while, in spite of the energy of the practice employed at the *Maternité*, they have almost as many deaths as cures in that institution.

The digitalis purpurea, which is recommended by Hamilton, may be tried in convulsions preceded by oedema of the limbs. The seton in the back of the neck, as advised by C. Baudelocque, ought not to be employed until all other remedies have been found insufficient: moxas and scarified cups are not likely to be at all more successful than leeches and the common revulsives.

To conclude, bleeding from the arm, the foot, or the jugular vein, is useful, and oftentimes even indispensable, in the convulsions of pregnant and puerperal women, whether of a slight or severe character, where the patient is young, strong, and of a good constitution, and not exhausted by preceding hemorrhages.

* M. Velpeau does not dwell with sufficient emphasis upon the use of blood-letting in these convulsions. In this country the amount of blood drawn for the cure of puerperal convulsions is determined only by the ability of the patient to bear its loss—I should be more pleased if M. Velpeau should recommend, instead of 15 ounces, the abstraction of 20 or 40 ounces; for, whatever may be the cause of the attack, it is attended with so great a determination to the brain that no time should be lost in reducing it by the promptest mode, *videlicet* by blood-letting.—M.

Local blood-letting is the only kind we can resort to where the convulsions supervene upon a flooding, or in persons who have been debilitated in any way, or those of a lymphatic constitution, &c. In that case, if they occur after delivery, and the lochiæ have ceased to flow, leeches may be applied to the labia or to the groin, as recommended by C. Baudelocque; otherwise they should be applied to the mastoid apophyses, according to the counsel of Chaussier.

When the vascular system has been depleted, if the state of the patient admits of it, a tepid bath should be prescribed; if irritation or spasmodic contraction of the os uteri appears to be the cause of the phenomena, some opium cerate or belladonna ointment should be applied to it. After a flooding, or a painful or fatiguing labor, or delivery of the placenta, some analeptic broths and a few spoonfuls of sound wine will occasionally be found the best remedies that can be made use of. Where the woman is delicate and nervous, we have recourse to sedative infusions and waters, narcotic preparations, &c. Sinapisms, blisters, scarifications, and other revulsives are, in severe cases, particularly useful as accessory in effect to blood-letting, or as supplementary to those evacuations, where they are themselves inadmissible. Finally, should there be manifest symptoms of disordered stomach or bowels, without any of the signs of inflammatory irritation, I do not perceive that there would be any temerity in promoting either the vomiting or the alvine evacuations by means of gentle emetics and purgatives; but, during the labor, the best remedy beyond dispute is the delivery of the child.

Where the disease comes on before the end of the sixth month, we ought to do everything in our power to succeed without soliciting the expulsion of the fœtus; its viability being at a later period possible, there is no longer any need for so many precautions on this head.

To admit of the child being delivered, either with the hand or with the forceps, it is necessary that the dilatation of the cervix should be very advanced, or at least that the os uteri should be soft enough to admit of the womb being entered without the employment of any great degree of force. However, if a trial have been ineffectually made of ointments, injections, and baths; if the woman or the child were in imminent danger, and a forced delivery the only means of safety; and in a case where the os uteri should be thin, but hard and undilatable, and obstinately resist the contraction of the womb, there ought to be no hesitation in following the counsel of M. Bodin, to make one or more incisions into its concave edge, or in resorting to what has been called, since the time of Simson and Lauverjat, the vaginal Cæsarian operation.

If the bladder is distended, it will be necessary to follow the advice given by De la Motte, and empty it by means of the catheter. As a general rule, we should, like Merriman, sound the woman twice daily.

During the fits, we should restrain movements which may become dangerous, but, at the same time, take care, whatever Roederer may say to the contrary, to allow them as much freedom as possible. It has been remarked that, by endeavoring to subdue patients forcibly, the convulsions are excited or augmented. Gardien speaks of patients who were attacked with tetanus from this cause. The same reason indicates that we should rarely open the jaws by force: the spoon, or other metallic plate, which we employ in such a case, being liable to loosen and even break the teeth. We must, therefore, proscribe the gag of which Madame Boivin speaks; as Madame Lachapelle remarks, it would be better to confine ourselves to forcing the tongue within the mouth at the commencement of the paroxysm, and every time that it has a tendency to protrude. A bit of cork between the teeth, as Gardien recommends, is a resource which it is well not to neglect.

§ 3. PROLAPSUS OF THE UMBILICAL CORD.

Although not a rare occurrence, procidence of the cord is not very frequently met with, for it was observed to happen forty-one times in 15,652 labors, at the *Maternité* at Paris; its being more frequently met with in private practice seems to depend upon the hasty manœuvres of the persons who assist the lying-in woman, rather than any other cause: Black has even asserted, but it is evident erroneously, that the descent of the cord is always the effect of attempts to hasten the delivery. A woman was brought to my amphitheatre while I was delivering a lecture; she was compelled to wait half an hour at the porter's lodge; no one examined her, and when she was brought up to the ward, the cord formed a loop of several inches hanging out of the vagina, although the os uteri was but very little dilated. Moreover, there are but few accoucheurs in large practice who have not had several opportunities of observing the same thing.

If Hart cites but five examples in four hundred deliveries noted at the institute of Wellesley up to the 31st of September, 1828; if Gregory shows only four in the Combe Hospital among seven hundred cases of labor; if Richter has seen but four in six hundred and twenty-four; we see, on the other hand, that Mazzoni has met with this accident eighteen or twenty times in four hundred and fifty deliveries.

A. The causes of this accident may be referred, 1. To the excessive quantity of the liquor amnii; 2. To too great a length of the cord; 3. To the too sudden escape of the waters upon the rupture of the membranes. Michaelis remarks, that if the cord, situated as it is found on the anterior surface of the fœtus in the midst of a large quantity of water, is not oftener drawn out, it is because the liquor amnii diminishes during the last month of gestation, because the funis is frequently wrapped around the neck, and because it often reascends by passing over the back of the child.

B. *Prognosis*.—The procidence of the cord has always been noted by authors as a dangerous accident. Not because it renders the labor more difficult, or causes the woman to run any greater risk, but because the fœtus is thereby exposed to the hazard of dying before it can be delivered. Its death in this case is indisputably produced by the cessation of the circulation of the blood through the cord, and all the reasons collected in the memoir by Thouret are insufficient to weaken this proposition; but the obstacle to the circulation has not been understood in the same way by all accoucheurs.

Until the time of De la Motte, who did justice to this notion, it had been generally supposed that the blood, from becoming chilled by the external temperature, coagulated, or became concrete in the loop of the cord hanging out of the vulva: we have long since entirely rejected such a supposition. Forced by the foetal heart to the placenta, and returned from the placenta to the heart, the blood appears so much the less susceptible of coagulating in the cord, so long as the infant continues to live, because the temperature is never very low about a woman in labor. I have often seen, on the contrary, pulsation persist, a long time after birth, in the cord, whether the placenta was still within the uterus, or the fœtus completely separated from the mother. I shall be able to add three observations to those which De la Motte and Dewees cite. We would, nevertheless, err in denying absolutely the influence of cold upon the blood in the cord. Forced to pass for a considerable distance through canals, which are inert, cylindrical, variously twisted, under an impulsive force naturally possessing little energy, and rendered still feebler by the operation of various causes, it is, without doubt, more exposed than in any other part of the vascular system to deteriorate, from the least alterations of temperature. We may conceive, then, that by passing rapidly from a temperature of twenty-eight or thirty degrees to one of eight or twelve only, it may, especially when the circulation is already more or less interfered with by some pressure, lose its fluidity and thus cause the

death of the fœtus; as Exton also thinks, and as Guillemot endeavors to establish by affirming that at Strasburg the immersion of the cord in warm water restored the pulsations.

At present, the accidents attending it are attributed to compression alone. In fact, as soon as the waters have all passed off, if the cord descends before the head, the breech, &c., its vessels are almost necessarily flattened during the expulsive efforts. Nevertheless, if the pelvis be very large, and the fœtus small, and if the cord is placed near one of the sacro-iliac notches, while the forehead or the occiput is towards the opposite one, the compression of its vessels may be so slight as not to prevent the blood from pursuing its route.

Death takes place from an excess of blood, or apoplexy, if M. Chambon is to be believed; from anemia or syncope, according to Baudelocque, MM. Capuron, Deneux, &c.; from asphyxia, or want of oxygenation of the blood, according to Muller. But neither of these three hypotheses is correct. It is impossible to maintain, with Fréteau, that the vein is less compressed than the arteries; or, with others, that just the contrary happens. All three of the vessels are compressed alike, and the death of the fœtus is to be explained, not upon the quantity, but the quality of the blood it receives.

If the cord is cold, without pulsation, shrunk, and greenish, the death of the child is indubitable; if the labor is still far from its termination, the head strongly engaged, and it is difficult to alter its position, the prognosis will be very unfavorable. On the contrary, if the pulsations are kept up with some degree of force, and the labor goes on rapidly, even although the cord be lank and shrunken, its premature escape may be followed by no unpleasant effect.

C. *Treatment.*—There are different ways of remedying this providence. If the child presents transversely, by the shoulder, or by the hips, and the os uteri be not sufficiently dilated to admit of an attempt to turn, we must try to return the loop into the womb; where the labor is pretty well advanced, we have to seek for the feet, and it would even be dangerous, whenever the pulsations of the cord are found to grow sensibly weaker, to wait for a complete dilatation before we act.

Where the pelvic extremity of the fœtus presents, as soon as the contractions become sufficiently strong, we have to favor their effect by pulling downwards in a proper way upon the lower extremities. But it is, particularly, where it escapes before the head, that the cord requires prompt assistance.

In such cases, the ancients confined themselves merely to pushing it up again, and keeping it wrapped up in a linen rag in the vagina. Mauriceau enveloped it in a bit of linen, soaked in warm wine, to prevent it from being chilled by the air. We see, however, that this practice, which was at first rejected by De la Motte, does not deserve all the reproach accorded to it, and that MM. Exton and Guillemot practically adopt it. Denman and Mackenzie maintain that the prolapsed portion should be carried up above the head in a bag or purse. Before replacing it, Oslander and Hopkins recommend that it should be supported with a piece of sponge, which was doubtless intended to prevent it from being pressed upon. Lœffler appears to have derived real advantage from this process, but it will not do, however, to place too much confidence in it.

Modern surgeons make use merely of their fingers, or of a piece of whalebone surmounted with a sponge or with a ring. Ducamp has recommended a species of pincers, enclosed in a canula, in most respects similar to the *porte-naud* of Desault; M. Dudan thinks we should be satisfied with a gum-elastic catheter, No. 9, furnished with its wire, which serves to fix the end of a ribbon passed through one of the eyes of the instrument. With this ribbon M. Dudan sustains the cord at the end of the catheter without compressing it, and returns it into the cavity of the womb, where he afterwards leaves it, first withdrawing the wire, and then the catheter itself. The canula *à charnière*, proposed by Wellemborg,

would in fact be more dangerous than useful, and I doubt whether any accoucheur will be ever tempted to make use of it. It has also been advised to introduce and fix graduated compresses or bits of sponge betwixt the head of the fœtus and the parts of the mother. Finally, Mr. Croft finds it more expeditious and more safe to carry the whole hand into the womb, so as to hook the loop of the cord over one of the limbs of the child.

Doubtless, most of these means might succeed; but there is not one of them that ought to be adopted exclusively; for the conduct to be pursued will necessarily vary according to the state of the circumstances.

When the child is dead, the presence of the cord requires no particular manœuvre. If it be living, the head may be, 1. Upon the point of clearing the inferior strait; and in that case we need only urge the woman to bear down upon the pains as hard as she can. 2. In the excavation, and the labor may go on but slowly; the reduction is here impossible, and if, after trying it, we find the pulsations of the cord diminishing, we must hasten to apply the forceps. 3. Lastly, scarcely engaged; here we take hold of the cord, and roll it up into a kind of ball which we endeavor to return by pushing it up by the side of, or even above the head, if possible, and if there is any tendency for it to fall down again, it should be kept there until the contractions have firmly fixed the cranium in the strait.

Champion employed a gum-elastic catheter, twelve or fourteen inches long and five or six lines thick. A silk ribbon, doubled, should be passed through it, one end of which should be passed around the loop of the umbilical cord, before it is passed through the second hole in the instrument, which should be fixed with a mandrin as long as the catheter. The whole should be then carried up into the uterus, and the mandrin should be withdrawn. This is, as we see, a fortunate modification of the process of Michaelis and Dudan.

Provided the introduction of the fingers were found too difficult, or insufficient, some mechanical means might be tried; such as the instrument of Ducamp, or Dudan, or, what is still better, the *porte-cordon* in the shape of a fork, invented by M. Guillon. Rather than proceed to turning, recourse ought to be had even to the method recommended by Dr. Croft.

On this subject, Madame Lachapelle, as well as many other moderns, says that the precept of the English surgeon ought not to be followed, inasmuch as, where the hand is introduced, it would be quite as speedy to draw down the feet. For my part, I am not of that way of thinking; the life of the child is too much endangered, in forced delivery by the feet, for us not to prefer delivery by the head whenever it is possible. The section of the cord between the two ligatures, as Deventer directs, would be too dangerous, if the labor did not take place speedily, for any one to dare to practice it at the present day.

When compelled to extract the fœtus by the hand or by the forceps, it is important to conform to the precept of Boer, which is that, previously to acting either upon the feet or the head, we ought not the less to endeavor to return the cord, which, without such precaution, could scarcely fail to be very much compressed, either by the hand of the accoucheur, or by the hips, the shoulders, or some other solid part of the child. In this point of view, then, artificial delivery is accompanied with much danger, and indeed such is its extent that Nannoni questions whether it would not be better to do nothing, and Mazzoni is not afraid to state that it is really more prudent in such cases to trust to the forces of nature. This opinion Guillemot maintains with us, and which will moderate to a certain extent the opposite opinion of Baudelocque. However, I do not think that we should hesitate when the forceps are applicable, and when the pulsation begins to grow feeble, or when, with the *os uteri* dilated, the head is still movable at the superior strait, if the preceding means have not proved successful. At any rate, if the labor is not speedily terminated, the child is

doomed to an almost certain death, and in deciding on extracting it we may not always doubtless deliver it alive, but we will save at least a certain proportion.

§ 4. DEFICIENCY IN THE LENGTH OF THE CORD.

A. *Natural Shortness*.—Until the time of Baudelocque, it was supposed that the delivery of the fœtus might be prevented, or at least considerably retarded by a very short cord. When the placenta is attached to the fundus of the womb, if the cord is less than six or eight inches in length, says De la Motte, the head, which is forced towards the inferior strait during the contractions, is found to rise upwards again during the intervals between the pains; the occiput is seen to engage in the vulva, to be on the point of clearing the strait at every effort made by the woman, and then, as soon as the pain is off, it re-enters the passage; and this continues for several hours.

The circumstance really takes place, but is altogether independent of the umbilical cord; it is chiefly to be met with in young women who are strong and robust, and at their first confinement. It depends upon the elasticity of the perineum: this flooring of the pelvis gives way while the womb, assisted by the abdominal muscles, urges the head onwards and makes it project from the parts; but as soon as the contraction ceases, its natural resistance returns the vertex into the interior of the pelvis. The cranium disposes to this end by its own elasticity. During contraction, it engages in the strait, but immediately afterwards re-ascends, so that its largest diameter does not escape from the pelvic circle. This is a phenomenon which is also observed at the superior strait, but less frequently, because the perineum there has no effect.

However, it would be incorrect to assert, as Baudelocque does, that a cord's being too short cannot in any case interfere injuriously with delivery.

The cord may be reduced to five, four, or two and a half inches. Leroux states that it was so short in one case that, after labor, the umbilicus of the child remained close against the vulva until the placenta became detached. Gray pretends that the belly of a new-born child was drawn, by it, so far within the vagina as to interfere with its respiration. In another case, indeed, the cord was almost completely wanting, and the placenta was as if attached to the abdomen of the child. In such a case the placenta is liable to be prematurely detached, which might facilitate the occurrence of inversion of the womb, give rise to hemorrhage, and bring the child's life into danger, should the labor be prolonged; the strain arising from it might weaken, or even arrest, or at least disturb the contractions of the womb, and suspend the labor. In fine, in some cases, the shortness of the cord may present a mechanical obstacle to the expulsion of the fœtus. The woman experiences very peculiar pains about the insertion of the placenta, pains which Guillemot compares with reason to those induced by traction on the cord for its too speedy delivery. Peu, Burton, and Smellie relate cases which leave no doubt on the subject. Indeed, we can scarcely comprehend how Puzos could say that the length of the cord is "ordinarily four feet," and that less exposes to accidents.

B. *Accidental Shortness*.—Without being absolutely too short, the cord may become so by twisting around the child; then this accident occurs from its excessive length.

1. *Frequency and varieties*.—The turns of the cord are frequently met with in practice, and more so around the neck than anywhere else. Peu, who has particularly studied them, and who has established a dozen varieties, has seen them in form of a sling about the forehead, on different parts of the head, on the abdomen, under the armpit, and on the limbs, &c. Carus has seen it five, and Pacoud six times around the neck.

After forming a collar about the neck, the cord may pass around under the

armpit, and over the back of the chest, as in the case met with by De la Motte. It may also pass between the thighs, over the back, and around the neck, or it may sometimes pass around the body, a limb, and the neck, all at once.

We see, in the dissertation of Ed. C. J. de Siebold, two curious cases of twisting of the cord. In one it passed from the umbilicus around the left arm, over the breast, around the neck, behind the shoulder and under the right armpit, over the groin, under the ham, around the leg, about which it made two turns, and under the right foot. In the other case, one of the two circles around the neck comprised also the armpit and the left shoulder. Strangulation of the child was the consequence.

I have observed these different kinds of turns, and have met with many examples in authors. The portion of the cord which then remains free may be really too short, and the same accidents may be feared as in absolute shortening. Besides, in strangulation, death is produced by the stoppage of respiration, and death cannot take place in that way in the fœtus: again, I do not see how the cord can be drawn so tightly as to obliterate the internal jugulars or the carotids. Therefore, at most, only the umbilical vessels are liable to be interrupted.

Twisting of the cord around the neck is besides quite common. Richter, of Moscow, has collected twenty-seven examples out of six hundred and twenty deliveries in his private practice. Siebold says that he saw twenty-one in a hundred and thirty-seven labors at the clinic at Berlin, in 1827, and Kluge gives sixty-three in two hundred and sixty-eight. We see by Guillemot's table that it occurs once in about five times; for this author gives three hundred and seventy examples out of seventeen hundred and twenty-five labors collected at the different German clinics.

It would appear, however, that these turns of the cord may exist for several months before the period of delivery, and thus give rise to some very curious anomalies. A fact lately observed by M. Monod, a resident pupil at the *Maternité*, proves that they may, like a branch of ivy round a tree, leave very deep grooves, and produce strangulations, &c., from which even the bones do not wholly escape. The neck of a fœtus, mentioned by M. Taxil, was encircled three times so tightly, that it measured only three lines in thickness. The child was well developed, and the placenta was very large. I have seen many aborted fœtuses, the death of which, and the atrophy of the cord, depended on no other causes. We may also find similar examples in the thesis of M. Doudement, where five grave accidents are related, as caused by the twisting of the cord.

2. *Prognosis*.—Twisting of the cord around the neck exposes to all of the inconveniences of its absolute brevity, that is to say, to tearing away the placenta, hemorrhage, inversion of the uterus, and severe pain. It also retards labor by the mechanical resistance which it opposes to the descent of the head of the child. The same occurs if it surrounds the shoulder, as in the case noted by Olinet. Indeed, the child may die from the arrest of its circulation. M. Guillemot, who was well aware of this latter danger, shows at the same time that De la Motte was not deceived by the movement spoken of by Baudeloque, and that some of the fears of the ancients were only too well founded. So long as the bag of waters remains entire, the uterus is prevented by the ovum from diminishing in size, and the cord wrapped around the neck will easily raise the fœtus up after each contraction. As the head is then retained in its position by its own weight, and as all the parts are smooth and very slippery, the circular turns around the neck loosen quickly, and allow the circulation to continue. After the rupture of the membranes, and when the head has reached the excavation or the inferior strait, it is different. The uterus contracts and forces the child down more easily, it is true, but the head, arrested by the superior strait,

no longer rises up between the contractions, and the relaxation of the womb, tending to pull the cord up also, increases constantly the constriction produced by the turns around the neck. We should expect in such a case to see the child born livid about the head, or in an apoplectic condition, if not entirely dead, when the labor is not terminated with great rapidity.

When the cord is considerably shortened by the twist around the neck, the labor at first presents no peculiarity, and it is only towards the close of the first stage, or that of dilatation of the os uteri, that it can be suspected. Many observations of M. Guillemot prove that from this moment the descent of the ovum seems to be suspended, although the woman continues to suffer; that the head rises entirely above the superior strait so soon as the contractions go off, and that the pain, which is peculiar and distinct from the ordinary pains of labor, induce the patient to desist from, rather than to assist by, the bearing-down effort. After the rupture of the membranes, the head progresses without any difficulty, and without any peculiar symptoms, until it reaches the floor of the pelvis; but it does not clear the perineal strait without presenting the same phenomena as at the superior strait. Here the finger introduced under the pubic arch and along the anterior walls of the excavation, will even, in some cases, reach the neck, and establish the fact that the cord does encircle it.

3. *Treatment.*—It follows, from these signs and from what has preceded, that the rupture of the membranes, as Guillemot shows, is the best means of remedying the first accidents from twisting of the cord around the neck, and that the labor cannot be terminated too speedily if we wish to preserve the life of the child. The method of Ould and Smellie, which consists in carrying two fingers into the rectum to prevent the forehead from rising up, can only favor the strangulation of the parts, and should not be practiced. That of Burton to rupture the cord near the umbilicus is dangerous and inapplicable, and does not deserve our attention. Moreover, it is very fortunate that these causes of dystocia seldom exist, for it is difficult to recognize them until the head has escaped from the inferior strait; except in some cases, where the pelvic extremity ascends first, and in which the cord may be felt firmly stretched either between the root of the thighs or around the legs, or simply along the abdomen, we can only suspect its existence, relying on conjectures too vague and uncertain to merit much confidence.

If, however, it should be ascertained that the cord is too short, it ought to be immediately cut, provided there should be any danger to the child, and the labor still far from its termination. Care should be then taken to deliver the woman as early as possible, either by the hand or with the forceps. When it is not discovered until the escape of the head, it is in general easily to be remedied: if the *turn* be a very loose one, and the cord very long, the birth of the child is most generally not at all obstructed by it, and nothing need be done; in the contrary case, we must either disengage or cut the loop, so that the respiration may not be long in becoming established. Dr. Smith, who relates a case of inversion of the womb, produced by the shortness of the cord, recommends with reason, that we should draw down a portion of that which is connected with the placenta, and then slip the noose over the shoulders, and not over the head of the child.

§ 5. ANEURISM.

An aneurism within the splanchnic cavities, or even in one of the great external arteries, is always a serious disease; but it is yet rendered still more dangerous by the efforts of labor. The contractions of the muscles and the repulsion of the blood consequent thereto might readily occasion the rupture of a sanguine tumor, if haste were not made in emptying the womb. In such cases, therefore, the patient should be advised to assist her pains as little as possible, and, as soon

as the orifice is sufficiently dilated or dilatable, the child should be extracted either with the hand or the forceps.

§ 6. ASTHMA, HYDROTHORAX, GIBBOSITY, DROPSY, &c.

All diseases that render the respiration difficult may make it necessary for us not to trust the labor to the mere resources of the organism. It is well known that asthmatic persons are soon threatened with suffocation when under any state of violent exertion; and that the same holds good of those who are laboring under some effusion in the chest, or in whom the free expansion of the chest is restrained by a deviation of the spine, &c. All wise practitioners, therefore, have recommended that, in these circumstances, the efforts of the woman should be controlled, and that she should be artificially delivered as soon as the state of the parts admits of the child's feet being brought down safely.

The same precept has been given where the labor is complicated by the presence of some large tumor in the abdomen, or with a dropsy in that cavity; and that, because here, as in the preceding cases, the efforts of the womb might give rise to a fear of asphyxia, or, at least, might be followed by a dangerous collapse.

However, I ought to remark that many dropsical women go through their labors almost as easily as those who are in the enjoyment of perfect health. I saw, at the *Hospital de Perfectionnement*, in 1824, a woman laboring under ascites who had been tapped thirty-six times, and who was, notwithstanding, delivered very naturally after a labor of a few hours' duration. Another came to the same establishment in 1826, who had been dropsical for four years, and whose labor lasted only two hours, although her abdomen was enormously large, and although from ten to fifteen quarts of fluid had been several times drawn off from the belly by tapping.

Mauriceau speaks of a woman who was dropsical for nine years, but who, during this time, was delivered of four living children.

Nevertheless, as the abdominal muscles are generally very much weakened and separated, in ascites, by a thick stratum of fluid, their mediate action can be possessed of but little energy in the expulsive part of labor. It has, besides, appeared to me that most dropsical women who have become pregnant, and who have been delivered without assistance, were affected with encysted dropsy, and not real ascites. The observations of Schenk, those of Langstaff, and especially the memoir of Scarpa, may be consulted on this subject.

§ 7. HERNIA.

When a hernia, of whatever species it may be, is reducible, it should be returned to its proper situation before the pains become very strong; and then, during each contraction, its escape is to be prevented by holding the thumb, a compress, or the hand, upon the opening through which it passes outwards. This manœuvre is to be attended to by the accoucheur, or at least by an assistant fit to be trusted, and not by the woman herself. When it is an old and irreducible one, we must be content to support it exactly, so as to prevent it from becoming strangulated, or receiving an addition of new portions of viscera to those already contained within the tumor. Beyond this, the labor requires no particular assistance, and we should confine ourselves merely to moderate the disposition of the woman to improve her pains by bearing down; nevertheless, should the violence of the efforts be such that nothing could prevent the descent, or if there should be strangulation and the labor far advanced, the child should be extracted, with all suitable precautions, as soon as the dilatation of the os uteri admits of it.

§ 8. SYNCOPE AND EXHAUSTION.

Some women are so delicate, or so irritable and nervous, that they fall into syncope from the least pains; in other cases, the syncope and fainting are due to the extreme distension of the uterus, to the force of the contractions, to inanition, to an attack of hemorrhage, &c. In a lady who was pregnant with twins, M. Désormeaux found them to last throughout the whole interval of the contractions, and the woman only came out of them while the womb was reacting with violence upon its contents. Antispasmodics and opiates, either applied to the os uteri or taken internally by the mouth or anus, cordial tinctures and other such articles, a few spoonfuls of sound wine or of broth, light food, &c., may be tried in succession or by turns; but, says M. Désormeaux, provided the life of the woman be threatened, we cannot wait for the effects of the remedies, no matter how well chosen they may be. Under such circumstances, to temporize would be a serious fault; we should terminate the labor as soon as possible, in order to prevent a fatal exhaustion.

It is uncommon for *weakness*, properly so called, to render a labor difficult. Every day, valetudinary and phthisical women are met with who can scarcely stand, and yet they bear their children without difficulty. Others are not prevented from being delivered naturally by a state of lethargy, asphyxia, &c.; and, on more than one occasion, the womb has been found to retain enough contractility in dying women, or in those who had just expired, to effect the expulsion of the ovum. There are two principal reasons why our succors are most commonly unnecessary in these cases: 1. Although the muscles and the uterus have to a great degree lost their contractile faculty, the soft parts of the pelvis and the perineum also offer much less resistance. 2. The feeblest women, even those who seem to be upon the point of expiring, ordinarily recover an amount of courage and energy that forms a striking contrast to their extreme exhaustion.

Notwithstanding, it is not a rare thing to see these momentary efforts followed by an oppression and sinking, from which the women recover only after having run the greatest risks; many of them even are scarcely delivered till they fall into a morbid collapse, or sink gradually into death after a few hours, as if, in acting with some degree of violence, nature's only object had been to terminate the great act of reproduction happily, at the risk of exhausting in an instant the small remaining strength still belonging to the organs. A young woman six months gone with child, who had been suffering for thirteen days from an attack of phlebitis, and who was in a decidedly adynamic state, was seized with the pains of abortion at four o'clock in the morning; at ten o'clock the os uteri was soft, and of the size of a three livres piece; at each contraction her cries, anguish, and agitation restored an appearance of strength, the existence of which was not suspected a few hours before; the poor woman was urged to redouble her courage, and make the utmost of her efforts; in fact, the child was delivered at about eleven o'clock, but in an hour afterwards she was no more.

Consequently, as soon as the os uteri is sufficiently dilated wherever there is reason to fear too great a degree of exhaustion, prudence requires us to have recourse to a forced delivery. The forceps should be preferred in such cases, provided turning be not absolutely indicated, inasmuch as it is less fatiguing for the woman.

§ 9. DIFFERENT RUPTURES.

The efforts of a woman in labor may produce many lacerations, which may require attention.

A. *Goitre*.—The thyroid gland becomes so swollen and engorged with fluid, in some cases, that it continues, subsequently, in a hypertrophied condition, which does not disappear easily.

B. *Emphysema*.—The swelling of the neck, during labor, may be uncon-

nected with the thyroid gland, and may be produced by an infiltration of air into the cellular tissue; a slight laceration of the trachea may occur, and then a true emphysema takes place. Of this, M. Jourdain has published a curious example, and Campbell speaks of one in which the breast was involved, as well as the neck.

C. Fallopian Tubes.—A tube with its blood-vessels may suffer laceration. M. Godelle speaks of a woman who died from hemorrhage following a blow, and in whom a rupture of the tube was detected; and death resulted from the loss of blood, caused by the laceration of one of the veins of the broad ligaments in the case of tubal pregnancy, observed by M. Ollivier. In the case of tubal pregnancy, which I observed with M. Dupré, and in the interstitial pregnancy of which M. Girardin communicated to me an account, together with the anatomical specimen, a fatal hemorrhage promptly followed a very slight laceration of the cyst.

D. Of the Hypogastric Vessels.—The same thing may occur to the hypogastric vessels, or to the ovarian. A case of this latter kind has been observed by M. Blizoid, and Ogle cited a case of it some time since, and another very recently. This accident is a grave one; an instant death is the usual result.

E. The Bladder.—We have seen, above, that the bladder is exposed to these ruptures, and that dangerous results may follow them.

F. The Psoas Muscles.—The muscles surrounding the strait, the psoas especially, in consequence of their attachment to the spine and femur, are violently pressed upon and distended, and may even tear in certain cases, as Chaussier has very well established. The same thing may occur to the recti abdominalis.

G. The Umbilicus.—The abdominal parietes may rupture in any part of their extent, especially in those portions which become thinnest, and which are most pulled upon during pregnancy. Bartholin speaks of a woman in whom rupture of the umbilicus occurred.

H. The Sternum.—The efforts of the woman are sometimes of such a nature as to disjoint or break not only the bones of the pelvis, but also the sternum. This fact Chaussier established in a case occurring at the *Maternité*, and MM. Comte and Martin-Saint-Ange have met with an example.

In all of these accidents, there is a common indication to fulfil; to terminate the labor as soon as possible, either by the forceps or by turning, at least if moderate efforts on the part of the woman do not effect it without assistance. We should here act with the view, and in the same way, as under the preceding circumstances.

§ 10. RUPTURES OF THE UTERUS.

Rupture of the uterus, which is a formidable accident, and one which is badly understood, occurs, especially during labor, though it is not unfrequently met with at other periods of pregnancy.

During gestation, it occurred at two months in the case observed by M. Moulins; at three, in that reported by M. Collineau, and in that of M. Puzin; at four months, in those of Campbell and Canestrini, in the latter of which the uterus was double. Dionis has seen it at six months. The nearer full term is approached, the more common is it. It took place at six months in Hott's case; at four or five months in that of M. Egge; and, again, at four months, in one of Duparcque's patients. Then it is ordinarily preceded for a long time by chronic disease of the uterus, or is immediately produced by some external violence, and scarcely ever takes place towards the neck.

As death is not always its consequence, and as the fœtus or the *debris* of the ovum does not escape for a very long time from the abdominal cavity, in some cases, ruptures of the uterus may become the origin of many of the pretended extra-uterine pregnancies. I might here relate a great number of examples, if I had not already done so in the article on Irregular Pregnancies. Many of the

pregnancies called utero-tubal, of which Patune, Hay, and Mondat, among others, speak, have, indeed, no other probable cause. The same thing is observed with animals. A ewe, mentioned by M. Hirtz, received a kick in the flank from a horse, while carrying her young, and soon after presented a tumor near the injured spot, from which a living lamb made its escape.

Ruptures of the womb, *during labor*, scarcely attracted the attention of the ancients. Albucasis seems, however, to have recorded one case of it, and F. Plater speaks of the concubine of a priest, who, in 1584, after being in labor for eight days, experienced horrible torment, and had the fœtus to present, subsequently, at the umbilicus. F. de Hilden cites an analogous fact, observed in 1593, and extracts two others from Cornarius; but Guillemeau seems to have been the first to understand well the nature of this phenomenon, which his predecessors confined themselves to mentioning.

The examples which he reports may be relied on, and prove what he has positively observed. In the case of a woman who was seized with convulsions, and who was seen by the surgeon Binet, the fœtus had escaped into the cavity of the abdomen through a large rent in the uterus. In another, who died of hemorrhage, the rupture occupied the left side, and Guillemeau does not hesitate to remark that, in such unfortunate cases, the patient should be delivered quickly. Since that time, cases have multiplied infinitely.

In Behling's case, the opening was on the right side, and the head and arms of the fœtus passed into the belly. Müller, who found the neck thick, pretends that the fundus and sides are not liable to rupture, which is directly opposed to what M. Deneux maintains, and to what is actually observed. Planque states a case of this kind, which was proved by *post-mortem* examination. The woman mentioned by Rivallier, and who, after experiencing all the symptoms, had a tumor at the navel, from which the fœtus escaped, piecemeal, presented also an example of rupture of the uterus. Saviard met with the rupture about a finger's breadth above the cervix; and Solingius has seen it at the fundus. Van der Wiel states the case of a woman, in whom it occurred to such an extent, in her fifth pregnancy, that the intestines became engaged in the uterine cavity.

The frequency of this rupture is such that Gregoire has himself observed sixteen examples; and Wickers and Ramsbotham, each twelve. Clarke and Powell met with it twenty times in 8,600 labors. M. Coffinière, who practiced in the provinces, met with fifteen cases himself; and the treatise of Crantz, the memoir of Douglass, which extracts two cases from Peu, two from De la Motte, two from Garthsore, two from the medical journals of 1780, one from Heister, one from Saviard, one from Hamilton, one from Pouteau, one from Steidde, added to his own three cases, the thesis and the memoir of M. Deneux, Baudelocque's report of Piet, the work of Dewees, and the memoir of Madame Lachapelle, do not do away with the necessity of new investigations on this subject. Lambert, who considers the accident very rare, is consequently wrong in admitting that it occurs only once in a thousand cases, although M. Pacoud speaks of but two ruptures of the womb in the 4180 accouchements which he mentions.

A. Causes.—The causes of rupture of the uterus are of two kinds, the *predisposing* and the *determining*. The first belong to the *vices* of the genital organs, or pelvis, to diseases of the womb, and to mal-presentations of the fœtus; the second to the uterine contractions, to external agents, and to improper manœuvres employed by art.

Scirrhus, as Schulsius has seen, a fibrous tumor or a cicatrix, favors rupture of the womb, by weakening the region which they occupy. The same may be said, and with greater reason, of softening, ulceration, and the partial thinning which is often observed on the interior of the gestative organ, and which Madame Lachapelle has particularly noted as the cause of the ruptures which she calls

chronic. A cartilaginous hardness of the cervix, already pointed out by Freid, or a complete or incomplete occlusion of the os uteri, will also produce it. In M. Lombard's case, it was occasioned by an obliteration of the vagina, and in that spoken of by Hare, it resulted from closure of the vagina and vulva. It may also be produced by a bony tumor of the pelvis, as in Holt's case. The posterior crest of the symphysis pubis, a deviation backwards of the superior margin of the pubis, a great projection of the sacro-vertebral angle, and contraction of the superior strait, are also its cause. In fine, everything affording an obstacle to the escape of the child may be classed among the predisposing causes of rupture of the uterus. Mal-presentations at first act in the same way; afterwards they determine such unequal relations between the power and resistance during labor, that most of the uterine efforts are expended on the irregular projections of the child.

The rejection of this cause is founded on the fact that the uterus, in contracting, always transforms the body which it contains into an ovoid, equalizing its periphery, on which the partial contractions of the organ have not as yet taken place, and appear even altogether impossible; so that a fœtus, all the parts of which are as hard and solid as a piece of wood, would not cause any laceration, notwithstanding the extreme efforts to which it is subjected. But the author should not deceive himself here, by a theory entirely false, though specious. The uterus is not a single muscle, and it is now proved that any one of its parts may contract without the others, so that it may mould itself, as it were, to the different parts of the child after the escape of the waters, in certain labors. A careful examination of the hypogastrium has proved this to me frequently, and it is a fact of which any one may become easily convinced in most attempts at version. Among the examples of rupture of the uterus, due to the salient points of the fœtus, I will cite that which M. Mazzoni has reported, and in which the knee of the child, pressing firmly against the sacro-vertebral angle during a violent contraction, became evidently the cause. It is not the less true, as Rœderer has long since insisted, and as M. Sarrois especially maintains, that this, as the other determining causes generally, could rarely exist to such an extent as to produce this accident, without the pre-existence of some lesion of the womb.

No doubt that a belly-band, or any compression badly made from below upwards, or from the pubis towards the chest, instead of from the umbilicus towards the pelvis, may assist in the production of rupture of the uterus during labor, or that the same thing may occur from a blow, a fall, or any violent pressure whatever, or from a blow from the horn of a bull or cow, as in the cases of Lechaptois and Lair, and in the two cited by M. Duparcque.

But none of these kinds of violence belong properly to labor, and ruptures of the uterus during delivery are not on this account less ordinarily the result of simple uterine contractions. The movements of the fœtus invoked by Levret, and again by M. Egge, are of no importance in their production.

As to obstetrical manœuvres, it is supposed that version, the employment of the forceps, the lever, crotchets, or of any other instrument carried into the womb, may be productive of great danger. This last class of causes are, however, not effective except in ruptures of the cervix and of the vagina. It was there, indeed, that the rupture took place in the cases of MM. Haime, Henschell, Duparcque, Amussat, Coffinière, and in that observed by me.

B. Its Mechanism and Seat.—Whether it is passive and by compression, as during pregnancy, or active and by contraction as during labor, the laceration of the uterus takes place most frequently by the same mechanism, that is to say, from within outwards, and in an indirect manner. When the distended uterus is compressed, it ultimately yields, not in the part which is pressed on, but at its weakest point. By its own contraction on its contents, it ruptures in the least resisting part, and not necessarily at that portion which is most distended.

It then follows that the *seat* of rupture of the uterus is less variable than might be at first supposed.

1st. The *neck* and upper portion of the vagina are most frequently affected, because it is on these parts that the manœuvres necessary in difficult labors usually exert their influence; 2d, because this region is the thinnest and weakest during labor; 3d, because it is on it that the head, or projecting part of the child, presses with greatest force; 4th, because the uterine contractions, tending towards the fundus, subject this part to the influence of two equally powerful forces; 5th, and finally, because, by bending the uterus backwards, the contractions of the abdominal muscles distend it more and more in the neighborhood of the sacro-vertebral angle.

Ruptures occur also about the *fundus uteri* and on the *sides*, especially the *left*, because these regions are least supported. If the fundus is its thickest portion, the placenta which is inserted there renders it less dense and resisting, and interferes with its contractions. The *posterior region* is little less exposed than the other, because it is only supported against the spine. In fine, if the cervix and upper part of the vagina are so often affected *posteriorly* and to the *left*, it is because the fœtus naturally tends to this direction by its own inclination and that of the axis of the superior strait; it is also because the posterior half of the neck is sensibly thinner, and not so well sustained as the anterior, which is protected by the *bas fond* of the bladder; and it is, in fine, because the axis of the vulva or the inferior strait directs the hand or instruments strongly in this direction.

The other predisposing causes explain why ruptures sometimes occur in other parts of the uterus.

The laceration, permitting the hand to pass into the bladder, which is spoken of by M. Champenois, was produced by an awkward *sage-femme*. The bladder was also involved in the case reported by M. Sousa Ferras, and in that of M. Le-cieux, where the fœtus passed into the bladder and became the nucleus for a calculus. M. Broyles has seen it occur in front and transversely, on a level with the pubis; Egge in front and towards the fundus; MM. Coquin and Capon in front and below; and M. Hendrie says that in his case it was in front, and at the union of the body and neck of the uterus. The case published by Malgaigne, and which occupied the same seat, seems to me to have been produced by version, rather than by the employment of *secale cornutum*. In one of Campbell's cases, it occurred in the anterior wall of the body, and Barbaut has seen it once above and behind, and another time at the fundus.

M. Hott reports one at the fundus, and M. Bernard-Latouche another, which was transverse; and it was the same with the cases of Runge and Toutaint-Beauregard. Levret thought that it was not more frequent towards the fundus, nor in the part to which the placenta was attached, and that the opinions on the subject were theoretical, and not founded on the observation of facts. In Bozan's case, cited by Millot, the rupture existed on the left side of the fundus, and in that of M. Collineau it was near the left horn. In the case published in the *Transactions* of 1701, it extended from the neck to the broad ligament, and from the fundus to the neck in that of M. Glen. It occupied the posterior wall in the case detailed by Hawley. A. Leroy, who does not think it possible at the fundus, says that he has seen it above the neck in a mattress-maker, and that it is the inferior lateral portion that is most frequently affected. M. Mazzoni has observed it beneath the left Fallopian tube. In Champion's case, and in that which Van der Wiel saw with Solingen, the opening was a little above the neck. It existed in the superior lateral portion in the woman who died after a ball, and whose case is mentioned by MM. Guibert and Moulin.

M. Coffinière, who says that he has met with fifteen examples, almost all produced by hasty or awkward manipulations, only speaks of the cervix and

upper part of the vagina. The rupture was utero-vaginal in the cases of Whatman, Smith, Conquest, Birch, Duparcque, and in one of those of Campbell. That published by Amussat had the same seat, and followed, as Coffinière's did, improper manipulations. Blundell says that he has met with it behind and in the neck, and that the slit is most frequently transverse; and Powell and Clarke have observed the same thing at Dublin. Henschell has given another example, and Haime, who has republished the case of Courtial, has also related a very interesting one. That of M. Moreno, which was taken for an extra-uterine pregnancy, evidently belonged to the same kind, as did also that which M. Chevreul gave in 1781.

C. *Incomplete Ruptures*.—The rupture of the neck is not always complete, especially when it occupies the lips, or the vaginal circle of this opening. It is then nothing more than a simple rent, which at first seems very deep, in consequence of the elongation of the parts, but which soon contracts so as to disappear almost entirely. If it extends deeper, the vaginal walls may become involved without experiencing complete perforation, but in some cases it may extend even to the peritoneum, which still remains intact. Of this variety many examples have been given. In one case, Radford says that the laceration extended from the neck towards the fundus. The child was hydrocephalous, and the head only rested in part in the vagina; there was no hemorrhage, and the peritoneum was perfectly preserved. The uterus formed a distinct tumor to the left, while the fœtus made a second to the right.

M. Duparcque has met with two cases, in which the rupture of the neck, leaving the peritoneum intact, was followed by infiltration of blood and pus in the direction of the loins, iliac fossæ, &c.; and a woman, the mother of six children, afforded me an example of the same thing. Dilatation in this case was regularly accomplished, but the head had assumed a mal-presentation. A change in the position of the woman was followed by the quick passage of the head into the excavation, and a tearing pain in the bottom of the hypogastrium, which was followed by death on the third day. The neck was torn down to the peritoneum behind and to the left, and a general peritonitis had set in. But the most remarkable case is that which occurred at the *Maternité* of Paris, where the uninjured peritoneum had prevented a considerable quantity of blood from being effused into the belly, by forcing it upwards until it reached the loins.

The uterus is also subject to another variety of incomplete rupture, which has in like manner been passed in silence until a recent period. In the preceding variety, the laceration took place from the interior towards the exterior, that is to say, from the cavity of the uterus to the peritoneum; in this, the contrary is observed, for the rupture commences in the neighborhood of the peritoneum. The first variety is more frequent than is usually supposed, and if it has not before attracted the attention of accoucheurs, it is because the rent is not usually very deep, and the cure most frequently takes place without the occurrence of any grave accident. I have already mentioned that the free portion, and sometimes also the remainder of the neck, are its ordinary points of departure. The second variety has been noticed by only a small number of practitioners. Clarke relates a case in which the patient died in fourteen hours without being delivered. The posterior region of the uterus presented a great number of rents, lacerations or fissures, which only involved the peritoneum, and which were covered with slight depositions of blood. Ramsbotham reports another, in which the fissure was also behind, extending several inches, but which did not touch the proper tissue of the uterus. A third case has been published by M. Chatto. The laceration was observed near the fundus of the organ, of the size of a *crown piece*, surrounded by many smaller fissures, and penetrated to the depth of several lines into the muscular tissue of the uterus. White, who collected these facts, has described a fourth, in which there were

two long lacerations in front, and a third which comprised a thin layer of the tissue of the uterus. Death appeared to result from effusion of blood into the peritoneum—at least we so understand from the observations of Ramsbotham, Chatto, and White. As to Clarke's case, another explanation is required, for there was only about an ounce of blood found in the neighborhood of the broad ligament.

Perhaps by hastening the labor, and by emptying rapidly the uterus, whether by rupturing the membranes, or by the extraction of the child, a stop may be put to the hemorrhage, as Ch. Johnson proposed to White; but how is this accident to be suspected during life? Besides, what assistance can we hope for from such means, when the symptoms are sufficiently grave to cause a suspicion of its nature?

On the other hand, the rupture, which is often transverse in the vaginal *cul-de-sac*, may exist to such an extent as to separate almost entirely the uterus from the vagina. I have met with this state of things twice, and in each case the accident was produced by violent operations with the forceps or with the hand. Barbaut cites two similar cases, and Robertson another.

Applied to the head, which it seems to hood, the neck is easily pinched up with the forceps, and detached by its external circumference, whether on one side only, or on both at the same time. Subsequently there result one or many little projections, from the large shreds or flaps which contract considerably after delivery. Of this, I have seen three examples. In one, the extremities of the four fingers could penetrate between the *septum* and the utero-vaginal walls. The head of the child even may cause this forcing down of the neck of the uterus by pushing it down before it, and by spreading it out either partially or completely as a crown, as I once saw. I am not certain whether such was not the fact in Scott's case, reported by Merriman.

Robertson, who reports nine observations of his own, and who borrowed one from Gartshore, one from Hooper, one from Dewees, one from Hamilton, four from McKeever, one from Doubleday, one from Powell, one from Spackman, one from McIntyre, one from Smith, ten from Ramsbotham, two from Birch, one from Clough, and one from Holmestead, making in all thirty-six, says that of this number the utero-vaginal laceration took place at the end of four hours' labor in 2 cases; 6 hours in 1; 7 hours in 2; 8 hours in 5; 10 hours in 3; 11 hours in 2; 12 hours in 5; 13 hours in 2; 15 hours in 2; 16 hours in 1; 17 hours in 1; 19 hours in 1; 20 hours in 1; 21 hours in 1; 22 hours in 1; 24 hours in 1; 30 hours in 2; 32 hours in 1; 35 hours in 1; and 40 hours in 1.

It occurred in the 1st labor in 1 of these women; in the 2d in 5; in the 3d in 6; in the 4th in 5; in the 5th in 3; in the 6th in 1; in the 7th in 4; in the 8th in 1; in the 10th in 1; in the 14th in 1; and in the 16th in 1.

The seat of rupture of the neck, mentioned in the thirty-one cases, was 1st, the anterior region eight times; 2d, the posterior region eleven times; 3d, the lateral region five times; 4th, the antero-lateral region three times; 5th, the postero-lateral region three times; and once the neck was almost completely separated from the vagina.

D. Signs of Rupture of the Uterus.—During labor, rupture of the uterus is generally announced by sufficiently evident signs. The woman experiences violent pain, with a cracking or noise, which the assistants even can sometimes hear; she feels that something has given way, and cries out that she has been *injured*, and that her *heart and bowels are being torn from her*, and that she will be killed, if there is any one near her performing the least manipulation. When the starting-point of the rupture is in the neck, the pain, which is so acute and characteristic, occurs especially at the moment when the head is about clearing the orifice or strait. The labor is at once suspended, and the belly flattens down and alters in appearance. If the os uteri is dilated, and the bag of waters rup-

tured, and the head advanced, a sanguinolent liquid escapes from the vulva. The touch does not detect what it before did in the upper part of the vagina. A sudden paleness and frightful syncope, sometimes mortal, soon come on; or else, if there is an effusion into the peritoneum, the patient feels a gentle warmth, which extends from the pelvis over the whole abdominal cavity. The walls of the hypogastrium become softer, and allow the fœtus to be recognized outside of the uterus, either by its movements, if it is not dead, or by its natural projections. The feebleness, inequality, and softness of the pulse are added to these symptoms, and soon leave no doubt as to the nature of the accident.

When the peritoneum is not lacerated, most of these signs are wanting, and everything is confined for the moment to a sensation of rupture with suspension of the labor. This is sometimes the case although the rupture is complete, when there is no effusion of blood and no displacement of the fœtus, or even notwithstanding the displacement of the child. Sometimes vomiting, and other symptoms of strangulation of the intestines, are superadded, as in Percy's case. This diversity of the accident is explained by the different results of the laceration.

Although the waters have most frequently escaped when the rupture occurs, we cannot, however, admit, with Crantz, that it is never otherwise. When it has not passed off, the amniotic liquid escapes into the peritoneum, and augments the danger by its indisposition to be reabsorbed. If the child is living, it may favor the extension of the laceration by its movements, and we would be wrong in maintaining, with M. Deneux, that its death ordinarily precedes the uterine rupture. When the wound occupies the upper portion of the vagina, or the neck of the uterus, and when produced by improper manipulations, the fœtus remains usually in the womb. The air which at once enters the belly, and which soon alters the fluids with which it comes in contact, produces a considerable tympanitis, and may hasten suffocation, as I saw in 1833, with Moulin, Halma-Grand, Bintot, and Maygrier, in a woman who had a large laceration in the upper part of the vagina. If the peritoneum is not torn, the blood becomes effused into the pelvic, lumbar, and iliac cellular tissue. Appearances of phlegmonous inflammation and suppuration may set in after some days; but there may be neither syncope nor lipothymia, and the disease may continue altogether local during a longer or shorter period. Instead of escaping entirely, the fœtus may have only partially done so. In the case given by Peu, one foot only remained at the fundus of the uterus. In that of Behling, the head and arms were only in the cavity of the abdomen. If it descends by the rectum and anus, as in Harrison's case, and if the hemorrhage is not profuse, nothing very disquieting may occur. If the head only clears the rupture, so as to be enveloped in the peritoneum, as Radford has seen, the accidents are not always very frightful at first. In fine, even when a part of the child is in direct contact with the peritoneum, the borders of the wound are sometimes reapplied so well that hemorrhage, or the effusion of any liquid, becomes at once impossible.

It is possible that the fœtus may pass entirely through the urinary passages, as Van der Wiel, De la Motte, and Haime, &c. saw, whether the placenta remains in its place, as in Dewees' case, or whether it escapes at the same time as in those of Moreno, Monro, and Van der Wiel, without having the abdomen filled with blood, gas, or any other liquid, and without the immediate occurrence of very grave symptoms. In other instances, on the contrary, and always when the intestines pass through the laceration, as in the cases of Percy, Van der Wiel, Birch, and Runge, or when the womb becomes inert, there may be a strangulation or a hemorrhage, which, added to the shock sustained by the nervous system, almost necessarily determine the formidable chain of symptoms mentioned above.

E. Prognosis.—Without being necessarily mortal in all cases, utero-vaginal

lacerations are very grave accidents, and indeed the most dangerous which occur at the time of labor. The examples borrowed from Plater and F. de Hilden show, however, that they are sometimes susceptible of a natural cure. Dubois reports a very extraordinary case, in which laceration took place for the first time, and the child became fixed in the right hypogastrium, and the mother got well. Another rupture occurred in a subsequent pregnancy, and this time the foetus escaped into the left hypogastrium. They were both removed three or four months afterwards, one by abscess, the other by an incision. There is also an account of a woman, whose abdominal walls even were ruptured, as well as the uterus, who recovered, although the foetus escaped by the new opening. A great number of examples, similar to those of Cornarius and Plater, have been since met with. The Italian journals of 1826 are filled with the account of a woman, who experienced a cracking, followed by peritonitis, and who afterwards had a hard and immovable tumor on the right side, and who subsequently discharged from the vulva putrid flesh. A new pregnancy occurred after the expulsion of the disorganized foetus, which took place piecemeal through the anus. In a patient of Müller, after severe pain, a tumor appeared and opened at the umbilicus, and discharged a foetus. The same thing took place in the case related by M. Salemi, except that the opening occurred at the hypogastrium, which it became necessary to enlarge; and in another, taken from Rust's collection, and in the case of the Pole spoken of by M. Weesf, who was assisted only by her husband.

Blegny states also that a woman, who fell during her fourth pregnancy, afterwards discharged the remains of a foetus from an abscess in the iliac fossa.

But these cures, to which may be added many of those which I have collected in the article on extra-uterine pregnancy, and the twenty-fifth, thirtieth, and forty-sixth cases mentioned by Bayle, Cheston, &c., are happy exceptions, and not the general rule.

F. Treatment.—The accidents following rupture of the uterus, and the necessary treatment, being nearly the same as in extra-uterine pregnancy, when there is laceration of the cyst, I will only dwell here on the means of delivery, either by the extraction of the foetus by the natural passages, or by gastrotomy.

The extraction of the child *per vias naturales* should be attempted wherever there is a chance of success. De la Motte introduced his hand into the belly, and delivered the child through the vagina, and the woman died on the fourth day. The same thing occurred to Hawley. Douglas was more fortunate, as his patient recovered. Dunn gives a case in which the hand was introduced so far as to feel the kidney, the woman recovered, and was delivered fifteen months afterwards without any accident. Smith seems to have succeeded equally well; and Blundell says that he once introduced his hand so far as the liver, before he could get hold of the feet, which were turned up towards the xiphoid cartilage, and that the woman recovered. Hamilton, Campbell, and M. Hendrie, each succeeded in the same way. If the head is in the excavation, it should be delivered with the forceps, and the same practice should be followed if it is even at the superior strait, when the laceration is of the neck or upper part of the vagina. When applied, the instrument should be introduced along the fingers, until it passes above the rupture, and as little effort should be used as possible. When the head of the child cannot be seized, it becomes necessary to search for the feet. If one foot only is found, it should be brought down and fixed on the outside, and the same should be done to the arm if it is first met with, as it will serve as a guide in searching for the feet. If the foetus is in the cavity of the abdomen, the hand should be introduced through the laceration, and the delivery accomplished through the vagina.

The child may become strangulated in the womb, and certain incisions may become necessary. In the case which I saw with Maygrier, the pelvis was con-

tracted, and the fœtus, which presented by the face, and which it was necessary to extract by the Cæsarian section, had acquired three times its natural volume, in consequence of a very extensive emphysema. After the extraction of the child, the hand should be again introduced into the uterus, either to remove the placenta or clots of blood, or, as Runge did, to push back the intestines, which had become engaged in the womb, and to make the organ contract. In M'Keever's case four feet of intestine came down.

As to gastrotomy, we should not hesitate to practice it at once, if it is found impossible to penetrate the natural passages, although the fœtus may be in whole or in part in the uterus. Hamilton has given five successful cases of this operation, Thibault Desbois has given one, and Lambron has resorted to it twice on the same woman. MM. Coquin, Capon, and Sommé have each had a case, and Ceconi succeeded in August, 1817. Ruth, Rust, Gais, Nægle, Weinhardt and Heim have each performed it successfully. Busch and Heim state, that in their cases the children were delivered alive. It seems to me that it is scarcely necessary to add others to the above successful cases of the operation in order to justify its performance: but we may mention that of Demay; that of Lechaptos and Lair, in which the large wound of the abdomen through which the fœtus escaped was cured by the suture; that of M. Eisell; and the anonymous memoir addressed, in 1834, to the *Société Médicale d'Emulation*, giving the following facts as examples of the successful termination of rupture of the uterus. One of M. d'All'Ara de Ravennes at the third month; one of Bengo at seven months; one of M. Radcliffe at seven months; one of Stein at seven months; one of Wetz at seven months; one of Sommer during labor; one of Neville during labor; one of Powel, one of Mackenzie, and one of Fritzel, also during labor.

It is, however, well to remark, that lacerations of the neck, which consist in nothing more than slight rents, are not generally of much importance. After the escape of the child, they often heal up without assistance, even when the rent reaches the bladder, as in the case reported by Sedillot the elder. The buttonhole-like openings produced by the forceps, or in any other way whatever, require scarcely any assistance. If they do not contract soon, all that is necessary is to incise them. This is not the place to indicate the treatment, should sanguine or purulent deposits form about the vagina, or in any portion of the abdomen.

ART. II.—ESSENTIAL DYSTOCIA.

Labor is essentially difficult where the passage of the fœtus requires the interference of art, from its being rendered impossible, or greatly obstructed from some mechanical obstacle. Of these obstacles, some depend upon the woman; others, on the contrary, depend upon the fœtus itself.

§ 1. DYSTOCIA OCCASIONED BY THE STATE OF THE FEMALE ORGANS.

The difficulties that arise in the organs of the female are sometimes referred to the soft parts, and at others to the hard parts of her structure. The former alone will occupy our attention here, inasmuch as the latter were treated of in the section on Deformed Pelvis.

A. Pelvic Tumors.—Various tumors have been observed in the pelvic excavation, and on more than one occasion great difficulty has arisen from them in regard to the birth of the child. In a case cited by Burton, a tumor, situated in front of the sacrum, so pushed back the os uteri that it became impossible to reach it.

They are pretty frequently found to occur in the perineum, or in the recto-

vaginal septum. Being variable as to size, consistence, nature, &c., they are far from always requiring the same kind of treatment; when not very large or capable of being flattened by pressure, if other circumstances are favorable, they do not always prevent the spontaneous delivery of the child. M. Moreau has reported a remarkable example, and B  clard has collected a number of facts to prove that these tumors may sometimes occupy three-fourths of the excavation.

Cysts of the ovaries or tubes, frequently lodging in the recto-vaginal pouch, may besides produce displacements of the womb, as MM. Voisin and Noble of Versailles were the first to prove. The two observations, derived by these authors from Montaulier and Laporte, added to the three furnished them by Dupuytren, show that the uterus was pushed down in the opposite direction to the tumor, and that it became necessary to puncture the cyst if it should become very large. In a case mentioned by Jackson, it was necessary to puncture it, and six pints of fluid were discharged, and the delivery took place by the feet. Burns gives another, which completely filled the pelvis, and which was extirpated successfully by a careful dissection. Denman speaks of one which rendered the labor altogether impossible, while in another case a simple puncture caused the easy expulsion of the f  tus. These cysts are far from being uncommon. Watson met with two, Jarritt two, Coley one; and Parke and Merriman have made them the subject of two very interesting memoirs. Burns, who has studied them with care, maintains that they should be pushed up if they continue movable, that they should be punctured if they contain fluid, that they should be extirpated when adherent, and that, in cases when these means are inapplicable, cephalotomy or the C  sarian section may be resorted to. On the other hand, Blundell, who calls all of the tumors recto-vaginal, located in the *cul-de-sac* of this name, says that they are formed of the ovaries nine times in ten, that in four cases in which a puncture was made three of the children were born alive, two of the women died, and two got well with difficulty, that embryotomy was practiced eight times, and that five died and one never recovered entirely, and that in five cases of version four of the women perished and all five of the children.

Scirrhus or fibrous masses connected with the ovary, the intestines, or epiploon, when sufficiently movable to sink down and lodge betwixt the uterus and sides of the pelvis, present a peculiar indication; they require to be displaced and carried above the superior strait; for this purpose, the woman must be placed upon her back or side, in such a way that the pelvis may be higher than the breast, and all the muscles in a state of relaxation; then, by means of the hand or fingers, we attempt to push the tumor out of the passage; finally, when all attempts at reduction have proved to be fruitless, it may become indispensably necessary to extract the tumor by making incisions through the vagina or rectum, or even to have recourse to the C  sarian operation.

Sarcomatous, scrofulous, fibrous, or other tumors that are situated in the cellular tissue of the pelvis, and that cannot be displaced, are much more dangerous than the foregoing ones; by resisting the head of the child, they expose the womb and other organs contained within the excavation to contusions, perforations, and lacerations, which it is not always an easy matter to prevent; they also induce inertia and exhaustion, and pretty frequently excite hemorrhages, convulsions, or various kinds of inflammations.

That which Stedman extirpated with success measured two inches in circumference. Denman mentions a case in which it occupied the superior strait on the side of the sacrum, rendering the delivery impracticable: one of the kidneys resting in front of the sacro-iliac symphysis, as Heusinger and Vidal saw, may cause the same difficulty unless it can be depressed, or is small enough to allow the head to pass. The same thing may be occasioned by a tumor formed of the debris of an extra-uterine conception, as in Lauerjat's case. When the morbid mass appears to arise from the sacro-sciatic ligament, as in the two examples

mentioned by Drew, we may, on the contrary, attempt extirpation, since Burns and Blundell say that they have each succeeded once.

Those of the recto-vaginal septum are, most generally, simple encysted tumors; this at least seems to result from the observations of Plenck, of Pelletan, and a case recently noticed by M. Roux, at *La Charité*, at Paris. The woman has sometimes succeeded in expelling them, either through the anus or through a laceration in the perineum. In some cases they have been ruptured by the muscular efforts, and that without any ill consequences, when the fluid they contained was permitted to escape into the rectum, the vagina, or even to be effused in the surrounding cellular tissue. The deposits of blood which sometimes form in this septum, of which M. Récamier relates a case, may be easily incised, if they do not burst spontaneously into either the rectum or vagina. Morlanne says that an enormous tumor was recognized in the vagina during labor, which proved to be an abscess, and burst, and the woman got well. But they may also end in abscess, gangrene, or a mortal peritonitis, if the laceration extends into the peritoneum.

It is, therefore, most prudent to empty them, or extract them, as soon as they are ascertained to be capable of hindering the escape of the fœtus, or rendering it dangerous, as we see in M. Gensoul's case. In such cases, it is not always an easy matter to distinguish an hydatid or encysted tumor from such as are solid; but, as has been pointed out by M. Désormeaux, a puncture with a small trocar will suffice to remove all doubts upon the subject.

B. Urinary Calculi.—It is evident that a large stone might, during labor, become situated directly behind the pubis, so as to shorten the antero-posterior diameter of the pelvis. But a stone, being violently pressed from above downwards by the child's head, would almost necessarily give rise to contusion or laceration of the bladder or of the recto-vaginal septum, as well as the pain that would ensue thereupon. It would be easy, at the commencement of labor, to push the stone upwards, and retain it above the symphysis pubis, until the head could get below it. Should the practitioner arrive late, and find the stone coming down before the head, he should, notwithstanding, endeavor to raise it above the strait. A primipara had been in labor many hours, when M. Dubois detected between the head and the pubis a solid tumor, which he pushed out of the way, and allowed the accouchement to terminate favorably. The tumor proved to be a calculus in the bladder.

Guillemeau, who reports the first instance of a labor which was interfered with by a calculus, says that a contusion of the neck of the bladder and an abscess followed, and a fistula through which the woman, "for a long time, passed her urine without being able to prevent it." In Lagouache's case, the cutting operation was resorted to, and a calculus removed which measured eight inches in circumference. Smellie, who cites a case in which the head of the child forced the stone away, so as to produce incontinence of urine, maintains that the calculus should be pushed back into the bladder, or that the child should be delivered by the feet. Indeed, I cannot understand how the hypogastric section could have been necessary in the case spoken of by Lauerjat. When the stone presents an obstacle to the accouchement, it must be below the head, and then it could not be extracted by the high operation. If it is above, on the contrary, we may expect to retain it there, and the operation would consequently be useless. Cephalotomy, which it was thought well to mention in the case described by M. Threlfull, and which caused the death of the mother the same evening, does not appear to me more appropriate. The vaginal section should only be thought of here, and the forceps or version may be always used with advantage, if the presence of a calculus is the only difficulty to be overcome. It would be better, however, to remove it beforehand, if its presence is recognized during pregnancy. M. Philippe, of Rheims, removed one which weighed nine ounces

and a half, towards the fourth month, and the labor subsequently was attended with no difficulty.

C. *Anomalies of the Vagina*.—The *labia* or *nymphæ* may have become agglutinated subsequently to the fecundation, and either wholly or partially close up the vagina. The hymen may be hard, fibrous, or cartilaginous, so as to leave but a small orifice, and thus interfere with the escape of the child. Delivery is not in such cases impossible: such feeble barriers are incapable of counterbalancing the energetic contractions of the uterus; but it is better to divide with an instrument those parts that have to be separated than to expose the woman to the risk of ruptures and irregular lacerations whose limits cannot be prescribed, and which might go to a dangerous extent.

This is a cause of the central rupture of the perineum which should be removed. If the hymen remains, there is always an opening in it, through which conception has taken place. The operation in such a case is extremely simple, and consists in one or many incisions, which may be made as the head passes the inferior strait, if not before the commencement of labor. F. De Hilden, Peü, Van Swieten, Ruysch, Barbaut, Nægèle, and Stedman, each relate two cases of it. Guillemeau also gives two examples. We see also, from the observations of A. Portal, Barbaut, and Bourgeois, that delivery may be sometimes possible without an incision. When the incomplete occlusion of the vulva is the consequence of certain diseases, we may proceed in the same way, fearing, however, that the perineum will still be ruptured, as in the cases of Bianchi and Champenois. The operations should be performed, if an accidental membrane closes the vagina so as to prevent the escape of the child, as in the mulatress spoken of in the Brazilian journals. We may, however, do nothing at all, if the parts seem to soften during labor, as if the head progresses freely towards the vulvar opening.

When the *atresia* is complete, and has occurred soon after conception, it is prudent to make an opening as soon as the head presses on the floor of the pelvis. Otherwise, the anus, the recto-vaginal septum, and the uterus itself may be torn, and lead to grave consequences. In such a case, the incision should be made between the meatus urinarius and the anus, so as to touch neither the rectum nor the urethra. G. Kroon, who says that he was obliged to divide the perineum to allow the escape of the child, should have acted thus, as Henckel had before done.

Where the vulvar extremity of the vagina is completely *obliterated*, no conception could possibly have taken place by the natural passages; but it is not uncommon to meet with *bridles* or partial contractions in some part of the canal. Where these fræna are not very old, or very hard, they ordinarily become softened, and yield to the mere progress of the labor; where they resist, so far as to awaken a fear of laceration of the womb, inertia, convulsions, exhaustion, or their own rupture, they should be divided by making a few small incisions on their anterior edges. A woman, who was in labor with her third child, and who, two years previously, was delivered by means of instruments, was brought to the Hospital de Perfectionnement, by M. Dubourgnet, after having been three days in travail. I was about to apply the forceps, but was soon arrested by a large crescent-shaped bridle, which was hard, and, as it were, fibro-cartilaginous, which was two inches above the vulva, and on the free edge of which I found it necessary to make three incisions. The accouchement was followed by no unfavorable consequences. We may find a number of examples of these different conditions in the works of Laverjat and De la Motte. Harvey speaks of a woman whose vagina was nearly closed, as the result of a labor, and who was, notwithstanding, afterwards delivered without assistance. The same thing happened in a case in which the canal scarcely allowed the introduction of a quill, and although the vagina only admitted the little finger, delivery took place in

eighteen hours in a patient of Plenck. Puzos, Denman, and Marbotin have each seen the same thing occur. In a patient mentioned by Duparcque, the contraction was such as to render it difficult to reach the os uteri with a catheter; but by simple dilatation, the accouchement took place without assistance, and without any accident.

D. *Of some other Affections of the Vagina.*—1. When the vagina opens into the bladder, fecundation being on that account evidently impossible, it is, therefore, useless to class this deviation among the causes of dystocia. M. Busch, who mentions a case in which the fœtus was developed to full time in the vagina, seems also to admit the possibility of cystic pregnancy.

2. Several authors, and among them Barbaut, who adduces the testimony of Dupuis, Puzos, Grégoire, Devigne, and Vermont, and still more recently, M. Marc, have made mention of women in whom the vagina opened into the *rectum*, who, notwithstanding, became pregnant, and yet were delivered without any artificial aid, or even a simple incision, the fœtus escaping by the anus.

3. Burns copies from the *Philosophical Transactions* a case of double vagina, the septum of which was lacerated during labor, so as to leave afterwards only a single canal. A simple diaphragm, situated high up, with a small hole in it, was the whole obstacle in Lemonnier's case, in which an incision and the forceps succeeded perfectly. A hard and fibrous circle, following difficult labors, situated near the os uteri, required also incision in a case reported in the *Gazette Médicale de Paris*, 1838, p. 925, but the child was born dead, and an incontinence of urine followed. In fine, M. Guillemot, who carefully watched the progress of labor in a woman whose vagina was thus contracted, remarked, as I have myself done on one occasion, that the bridles and nodules begin to relax as soon as the head enters the excavation, and that at each pain the circle dilates just as the os uteri does, although the cranium may not press against it.

4. Stegmann relates the case of a girl whose vagina opened *above the pubis*; and Morgagni speaks, after Gianella, of a case in which fecundation nevertheless took place: in such a case it would be necessary first to try, like the Italian accoucheur, to dilate the preternatural opening, and should that prove insufficient, to make several eccentric incisions upon the orifice, not losing sight of the proximity of the peritoneum and bladder.

E. *Tumors of the Vulva.*—1. *Scirrhus* or *fibrous tumors*, capable of affording an obstacle to delivery, and requiring serious operations, rarely occur in the vulva; but chronic or acute phlegmons are met with that might be singularly aggravated by the passage of the fetus, and it is important, therefore, that they should be very energetically treated in women who are approaching their term.

2. The labia are, at times, the seat of *bloody tumors*, of a particular kind, that I have long mentioned in my lectures, which Dr. Dewees also has described in the American journals, and to the consideration of which I shall return when I come to treat of the accidents of parturition; for the present, I shall content myself with stating that, where they are sufficiently large to interfere manifestly with the birth of the child, or expose the mother to very acute suffering, I should not hesitate about plunging a bistoury into them, so as to empty them completely.

3. Some women, though in other respects robust, are affected, towards the close of pregnancy, with a considerable *infiltration* in the lower limbs, and even in the whole body. The cutaneous and mucous folds of the vulva may in such cases attain to an enormous size, and completely close the vagina. The termination of a labor is thus rendered, of necessity, much more difficult, and, above all, much more painful. It cannot be dissembled that, by leaving nature to herself here, there will be reason to fear the occurrence of gangrene, or of more or less extensive lacerations. Unhappily, although threatened with such dangers, there is little that the accoucheur can do. Some punctures, the application of emollient

and sedative lotions, and care in relation to the disposition of the parts and to the muscular efforts of the woman, afford all the materials for his counsel.

F. Inversion of the Vagina.—*Inversion of the vagina* may take place during pregnancy, and even during labor. Kerkringius, who did not think of displacements of the uterus, looked upon it as very common. The enormous inversion of the neck observed by Mauriceau on the 11th May, 1669, was nothing else. I was called, last spring, by Madame Bevalet, to see a woman who had been suffering for thirty hours without being delivered. The head of the fœtus was quite down in the excavation; but the vagina, which was entirely inverted, exhibited outside of the vulva the appearance of a fungous and livid cushion larger than two fists. It was necessary to apply the forceps for the delivery of the patient. During labor, Mauriceau compares it to a large *phimosis*. Deventer, who often observed it, says that the *sages-femmes* of Frize call it *ceinture*, and states that, after its reduction, the os uteri should be maintained in its place until the end of labor. I do not know whether the *bourrelet*, or *varice*, mentioned by Peü, and which was pressed on and ruptured by the head, giving rise to hemorrhage, was not also an example of it. The swelling, spoken of by M. Novara, which was torn away by a surgeon, being mistaken for the placenta, was probably of the same kind. Lauverjat gives a case, which recovered, although the introduction of the hand tore the neck. Bécларd met with a case; and Rougemont, who cites another, says that, by means of incisions, the delivery was allowed to take place. M. Devilliers assures us, on the other hand, that he has seen the whole inner membrane of the vagina come away. Specimens to prove this were exhibited at the time to the Society of the Faculty of Medicine. As this inversion does not appear possible before the head can have become engaged in the superior strait or excavation, it will almost always admit of the use of the forceps. Incisions, as prescribed by Giesman, and repudiated by Burns, or scarifications, should not be resorted to, unless the plan which I have followed should be found inapplicable.

G. Alterations of the Os Uteri.—1. Much has been said about the obliteration of the os uteri of women in labor; but if it is not wholly certain, it is at least highly probable that the authors who have mentioned it were misled by some deviation affecting the os tincae. I have already seen so many practitioners, even experienced ones, affirm that there was no os uteri at all, in cases where it was merely raised up towards the sacro-vertebral angle, that it seems to me very easy to refer a great majority of the cases of supposed obliteration of the os uteri to this mistake alone. It is evident that nothing less than some severe disease, some acute inflammation, could thus close up the mouth of the womb, betwixt the fecundation and the term of gestation; but in that case the parts would necessarily be affected with concomitant alterations of structure, sufficient to remove all doubts; the anamnestic signs would have attracted attention previously, and abortion could rarely fail to take place. Amand says, indeed, that he has found the os uteri closed by a membrane, and that dissection after death proved it to be so; but, as Lauverjat has remarked, this case, which is also related by Littré, is not accompanied by such circumstantial evidence as to render it conclusive. Denman himself doubts whether a real obliteration of the os uteri was ever observed during pregnancy, but believes that some obliquity is most frequently mistaken for it. How is it that this mistake has not been admitted, especially when the os uteri has been detected in its natural position some days after the escape of the child, as in one of the observations of Lauverjat and in that of M. Martin! The occlusion of the neck is so difficult that the severest operations are far from always producing it. Amputation of this portion, for instance, closes it so little that many women who have submitted to it have become afterwards pregnant, and have been delivered without assistance or by the forceps. It may, however, possibly occur, as I have had a proof of in the case

of a woman under the care of M. Caffé, in December, 1883. The labor had lasted ten days. The upper part of the vagina formed a *cul-de-sac*, every part of which could be reached without difficulty, and it was easily ascertained that the orifice of the uterus was completely closed. Besides, it could be felt a little posteriorly in the form of a hard and triangular cicatrix. It was necessary to make an incision, and the fœtus was delivered alive through the artificial passage. The woman recovered entirely, and the menses were discharged through the opening. It has since been discovered that this woman had attempted to produce an abortion by an injection of caustic lye, and that her criminal attempt had been followed by prolonged sufferings. We shall see, when speaking of the vaginal Cæsarian operation, that MM. Berg and Lobstein were not less successful in a similar case.

However, if authentic examples be wanting of complete obliteration at the period of labor, we at least possess several instances of coarctation, partial or total induration, and still more numerous ones of stricture in some other portion of the cervix uteri.

2. *When contracted or closed by tumors.*—Were the canal closed by a spongy or polypous mass, like those met with by Denman, M. Evrat, and Busch, we should wait for its descent into the vagina to attempt its extraction, as recommended by Soumain, after which we should proceed as in any other case of parturition. F. de Hilden, who speaks of a very large cancer of the neck, says that the labor could not take place, and that the woman died. When the tumor is situated on the posterior wall of the neck, it may be incised, as in the case of James Bell, with success; but this should not be thought of when it occupies the wall of the uterus itself, of which a case has been related.

A scirrhus induration, of partial extent, might require no particular assistance. In a case mentioned by M. Désormeaux, the whole dilatation took place at the expense of only two-thirds of the circumference of the orifice, and the escape of the ovum was scarcely retarded; but if the whole of the cervix uteri were involved, either at its vaginal extremity, or at a point near the cavity of the uterus, the vaginal-Cæsarian operation would be indicated, it being well understood that a forced dilatation with the fingers or the *speculum* either could not be attempted, or had been vainly tried.

Incision has been now practiced so frequently that its value cannot be longer contested, but we cannot say, with M. Bazignan, that it is never followed by any accident, and I believe that it would be wrong to resort to it too soon. I fully participate in the opinion of M. Fodéré, and believe that it is often put in practice without necessity. An os uteri may appear hard and fibro-cartilaginous to an inexperienced practitioner, and in certain cases in which the labor at first progresses very slowly, although there is in reality no disease, and when the organism may very well affect the dilatation. However, when it resists the tampon, bleeding, and different relaxants, it is better to imitate Coutouly, Lemoine, and Lauverjat, and divide it, instead of waiting for a laceration to take place. The success obtained by M. Bonnelat in a case of almost cartilaginous hardness, with considerable contraction, is a further proof in support of this precept. When scirrhus induration and degeneration are far advanced, artificial aid becomes indispensable. Forced dilatation may give rise to dangerous lacerations, says Busch, and incisions are preferable on many accounts.

M. Joerg admits himself that the neck of the uterus interferes more frequently with the escape of the fœtus than the pelvis does, and Hamilton thinks that its rigidity is one of the most common causes of retarded labor, and M. Meissner adds that *dystocia* depends more often on it than on the bony structures. Others think, and with reason, I believe, although opposed by Rœderer, that in certain women the fat about the uterus may also render the labor difficult.

3. *Different diseases.*—A fibrous tumor, a scirrhus, a polypus, cicatrices, an ulcer, an abscess in the substance of the womb, or even upon its internal sur-

face, would also require particular precautions, provided it were possible to ascertain their existence. In the first place, the diseased point does not, in general, partake in the extension of the organ during pregnancy, or does not contract again after delivery; in the next place, it deranges or interrupts the contractions during labor, and in that way favors the occurrence of convulsions, laceration of the womb, hemorrhage, inertia, and general exhaustion. In order, therefore, to protect the woman as far as possible from such dangers, it would be necessary to extract the child without waiting too long, either by the hand or with instruments.

It is the more necessary to be forewarned by this precept, as cancer of the uterus, for example, by no means renders pregnancy impossible. If, as the observations of M. d'Outrepoint, and many other examples, besides the two collected by me, prove, parturition may often take place without assistance, and if, as in the case published by Troussel, and in one of mine, the progress of the disease caused the death of the woman before full term, we are not the less obliged to admit the dangers enumerated above, and the necessity of rendering assistance to the unfortunate individuals suffering from such affections.

H. *Displacements*.—Labor is also sometimes rendered very difficult, and even wholly impossible, by means of *displacements* and *deviations* of the womb.

1. *Falling of the womb*.—There are instances of complete prolapsus which do not prevent the woman from being fecundated; witness the peasant woman mentioned by Gorgoni. Pregnancy is even sometimes the remedy, as in the two cases cited by M. Ménard, and in those of Wagner and Camus. In other cases, the falling of the womb occurs during pregnancy. In both cases, provided the gestation goes to its full term, it is possible for the womb, which here cannot be seconded by the abdominal muscles, to deliver itself alone; but it is also possible that the pains should prove to be insufficient, and thenceforth prudence requires us to make use in succession of decoctions, mucilages, and ointments of an emollient nature, and resort to the dilatation or incision of the edges of the orifice, and afterwards bring down the child's feet.

Harvey and Van Swieten long ago spoke of a procidentia of the uterus, which did not prevent labor from taking place without assistance. It formed a considerable tumor between the thighs in the case cited by Portal, and although dilatation of its mouth took place with difficulty, the child, a girl, was born alive, and the mother recovered. Harvey's patient died. Deventer, in a case with Haye, saw the head and neck of the child, covered by the womb, escape entirely from the pelvis. The woman mentioned by Fabricius, who had complete prolapsus, was also delivered without any assistance, not even simple dilatation of the os uteri. In Mullner's case, the prolapsus took place at five months, and the delivery was effected, also spontaneously, at least so far as incisions were concerned. The expulsion of the fœtus occurred at five months in Pichausel's case, and abortion also followed in that of Schelhammer. Hill was not mistaken in saying that displacement of the uterus is a cause of abortion. In Coulson's case, the prolapsion pre-existed, and the fœtus escaped at five months. Burton succeeded in pushing up the organ, after removing three pints of urine from the bladder. Richter succeeded also in replacing the womb, by keeping his patient on her back, and by using a suspensory apparatus, so that delivery took place without any accident. The forceps became necessary in the case mentioned by Henschell, and in that published in the Italian journals, and in that given by M. Miscogliano. A callous os uteri, in Boistard and Py's case, required a large incision on each side. The child was dead, and the mother recovered. The same thing occurred in Marrigues' case, except that the womb was strangulated like a gourd at the inferior strait. MM. Ashwell, Kingdon, and Ryan have given examples in which the labor terminated without assistance. Decreux and Saxtorph have met with cases. Lauverjat mentions the woman Avard, who became pregnant after suffering from the accident for fifteen years, and who was

delivered of a dead child by the assistance of incisions and lacerations. In a case in which the womb was pulled down by the head, Chemin d'Evreux succeeded by making a crucial incision eighteen lines long in the neck. In an example mentioned by M. Dupuy, the head, enveloped in the womb, projected into the excavation, and was taken for the bag of waters by the midwife. It was pushed down towards the vulva by the efforts of the woman, so that after labor a large transverse opening was detected near the natural orifice. In fine, we see, in a case of M. Fasola, which is somewhat obscure, that the uterus escaped during labor and was ruptured near the fundus, without producing death.

If this collection of facts shows that it is often useless to incise the os uteri, it proves, contrary to the opinion of Burns, and confirmatory of that of M. Archer, that division of this orifice is sometimes indispensable under such circumstances. Nothing, therefore, in all that has been stated, leads me to modify the principles proposed at the commencement of this article. I will only add that in a case of incomplete descent accompanied with adhesions, Campardon was obliged to perform the recto-vaginal Cæsarian operation.

2. *Hernia of the womb.*—Sennertus and Ruysch have related cases of hernia of the womb, where the women have, notwithstanding, become pregnant; but every consideration leads to the belief that mistake here has more than on one occasion arisen from a very decided anterior obliquity of the womb, as is shown in Wimmer's case.

This kind of displacement forms, in the opinion of several authors, an insurmountable obstacle to the spontaneous termination of labor; so that, under such circumstances, they have thought of no better counsel than that of resorting to the Cæsarian operation: however, this last recourse will hardly be taken by a man who is fully acquainted with the resources of the animal economy. Provided the reduction be possible, the accoucheur will attempt it: in the contrary case, he should be content with recommending the horizontal posture, and advising the woman not to bear down. During the contractions, and even during the intervals between them, it is proper to press the uterus backwards, with the two hands applied to the epigastrium, as if to make it re-enter the abdomen; by means of these precautions, which are not even always indispensable, the os uteri dilates, opens, and the labor most frequently terminates without further assistance, and without danger, even in cases apparently the most difficult. An accoucheur at Copenhagen, M. Saxtorph, was called to a woman who had for a long time had a crural hysterocoele, and who exhibited some symptoms of pregnancy; the period of delivery arrived, the surgeon had given the most unfavorable prognosis, and thought he should be under the necessity of performing the operation of hysterotomy. But nothing of the kind happened, and the labor terminated spontaneously. Ruysch and Simon relate two cases of uterine hernia equally remarkable; in one of them the Cæsarian operation was performed, and the woman died; in the other, nothing was done, and both the mother and child were saved. If the hernia is umbilical, as in the two cases met with by Flamant, as M. Gravis says, this operation may certainly be avoided. A woman who had a uterus *en besace*, with great deviation of the neck, would not submit to the Cæsarian section according to Lauverjat, and died, though after spontaneous delivery. If version was so difficult in a case observed at Maygrier's amphitheatre, and in another published by Halma-Grand, it was because there existed at the same time deformity of the pelvis or alterations of the uterus.

I. *Deviations.*—Simple deviations of the womb may also interfere with the progress of parturition, and require some particular care. Upon this subject, I ought to remark that it is far more important than writers seem to suppose not to confuse deviations of the cervix with those of the womb strictly so called. In fact, although the deviation of the orifice pretty frequently coincides with that of

the fundus of the organ, it is nevertheless undeniable that one is often met with without the other.

1. *Of the womb.*—When the womb is inclined laterally or backwards, no great difficulty can arise as to the delivery of the child, provided there should be no other cause of dystocia. In the anterior obliquity, on the contrary, especially when it is to a great extent, the assistance of art may become indispensably necessary. The woman should be directed to lie down at the very beginning of the labor, and told to remain in a horizontal posture, taking care to keep the hips considerably elevated; the hypogastrium is to be pressed backwards, while, by means of one or two fingers introduced into the vagina, we attempt to draw the os uteri to the centre of the pelvis. These last-mentioned tractions, which are useful where the orifice is found raised upwards towards the sacro-vertebral angle, need not be tried in cases where the womb, instead of being inclined by a see-saw motion, is bent forwards on its anterior surface like a chemist's retort. But in that case we should direct the woman to moderate, or even to suspend, her efforts; for, during the pains, the action of the diaphragm and abdominal muscles tends constantly to augment the obliquity, and thus to annul the efforts of the practitioner in a contrary direction.

In the spring of 1825, I was called by M. Majesté to a woman whose labor had been at a stand for several hours, notwithstanding the pains were very severe. The womb, bent into the form of a retort, was so disposed that at each contraction its posterior surface became quite horizontal. I showed the patient that her efforts were not only of no use, but also that they were sufficient to prevent her labor from coming to a conclusion. She was obedient to the counsel I gave her, and resisted, as far as she possibly could, the sensations that excited her to bear down. It was not long before the womb rose up of its own accord during the contraction, the head soon engaged, and in two hours afterwards the child was born. There are, therefore, certain cases of inclination where the labor ought to be abandoned almost entirely to the mere contractions of the womb. Peu, who, when the womb is *en besace*, maintains that it should be lifted up and pushed back during labor, reports many observations of the kind.

Doubtless, Moschion and Deventer were wrong in maintaining that obliquities of the womb most frequently produce a transverse position of the fœtus; but it would be quite as unreasonable to maintain that this effect never does take place. Sennertus has already indicated them as the cause of dystocia; Amand, who speaks of them under the head of vices of situation, and Peu, who pointed them out before Deventer did, understood very well their influence; so that Ould and Smellie, who reject them, can only be opposed to them in consequence of the exaggerations of Deventer. If the inclinations of the womb do rarely suffice to produce real transverse or shoulder presentations of the fœtus, they, at least, seem to me to be very frequently the causes of presentations of the face, the forehead, the nucha, the parietal protuberances, the hips, &c., and in this respect to deserve the attention of the accoucheur.

2. *Anterior deviations of the head of the child, and posterior deviations of the uterus.*—I ought in this place to mention a kind of deviation that I have never met with but once, of which I have been unable to find any cases described by the various authors, and which ought not to be confounded with anterior obliquity.

In a woman who came to be confined at my amphitheatre in the month of May, 1828, the fundus of the uterus was rather inclined backwards than forwards; the head of the fœtus formed above the strait a considerable projection, which descended nearly to the vulva, and was at last situated in front of the symphysis pubis; the os uteri, which was on a level with the superior strait, seemed to be scooped out of the substance of the posterior wall of the womb, which made it much longer behind than before; in order to reach the orifice and penetrate to-

wards the head of the child, I was obliged to bend my finger so as to make it pass almost horizontally above the pubis. Such a state of things surprised me, and I mentioned it to the students, who easily satisfied themselves as to its existence. The progress of the labor was so much retarded by it that, after seven hours of pain and pretty strong contractions, the os uteri, although very soft and very dilatable, was scarcely open at all. M. Désormeaux, whom I invited to see this remarkable case, said that he had never noticed one like it, and agreed with me that, by means of position and the assistance of the hand properly combined, I ought to try to carry the head to the centre of the superior strait, by making it slide from below upwards and from before backwards over the pubis. I began to execute this manœuvre at half past eight o'clock, and continued it, alternating with several of the students, until nine o'clock. From this time there was no longer a tumor in front of the symphysis, and the labor progressed so rapidly that in less than an hour the child was born, and the placenta itself expelled. M. Broqua seems to me to have met with something similar, for he says that the top of the head was in front and above the pubis, and that the occiput looked to the left and the face to the right.

Such a state of things seems to depend: 1st, on a posterior inclination of the womb; 2d, on the excessive inclination of the superior strait; 3d, on some deviated position of the fetal head; and, perhaps, upon the thickness or the unequal density of the walls of the womb. To this displacement should be referred the positions described under the name of *sur-pubal* by Madame Lachapelle and M. Dugès.

3. *Summary of the deviations.*—It has been said that the anterior inclination of the womb is the only one which requires attention during labor. Where it exists, the foetus engages with difficulty; the abdominal walls, too much curved, contract with little force; and if the head, notwithstanding, enters the excavation, the os uteri mounts up behind, while the anterior parietes become thin and distended, enveloping the head like a cap, and descends beneath the strait.

This occurrence is embarrassing to beginners. It may induce them to think that dilatation is complete in some cases, when it has scarcely commenced; most frequently, not finding the os uteri, they suspect anomalies, or do not know what to think. For instance, a young *confrère*, who has practiced with distinction for three years in the capital, wrote me on the 8d of January, 1827: "I have passed the night with Madame de S. A.; the labor appears to progress regularly, but I cannot find the orifice; I have carried the finger towards the promontory, towards the iliac fossæ, and then in front behind the pubis; everywhere I reach the *cul-de-sac* formed by the superior extremity of the vagina, but I cannot find the os uteri: what shall I do, what can be done?" The orifice was only carried upwards and backwards over the tumor, and in order to reach it, it was necessary to crook the finger forwards like a crotchet.

Every time that I have met with the peculiarity, which, I repeat, is very common, the labor progresses very slowly up to the close of the first stage, but I have afterwards seen it progress with great energy, and require no particular attention, as Barbaut has also done.

I have many times found the orifice turned so much backwards or to the outside, that its plane was almost parallel to the axis of the woman's body, although the rest of the womb was scarcely deviated at all. Excessive amplitude of the pelvis, great inclination of its superior strait, and presentations of the vertex, are probably the causes that most favor its obliquity. In touching, we feel, sometimes almost at the bottom of the excavation, and at others rather higher up, a tumor, generally very even, and which consists of the child's head covered with the anterior wall of the distended cervix of the uterus. This state of things has to me seemed to impress upon labor a peculiar character of tediousness, and often coincides with what is called *pains in the loins*. It is there that the rupture

of the neck, which was spoken of above, is to be found to such an extent as to allow the foetus to escape by the wound, as in M. Dupuy's case, or else we may fear that the incompetent may mistake the tumor for the bag of waters, or seize it with the forceps, thinking that it is the head alone which is acted on.

The ablest writers, and Baudelocque himself, recommend, as a remedy, that we should hook the os uteri with one or two fingers, draw it towards the centre of the pelvis during the intervals between the pains, and keep it there during the contractions; or also have recourse to vaginal hysterotomy, the only means of avoiding gangrene, or rupture of the womb, &c. Were I to depend upon my own experience in this matter, I should be led to think that the interference of art, in this state of things, is rarely necessary, and that in more than one case there has been too great haste in acting, to the great detriment both of the mother and child. I for a long time conformed to the precepts laid down in the books; I pulled at the os uteri, and did all I could to bring it back to the centre of the excavation; it is true I succeeded, but pretty often not until I had remained several hours with the woman. I was one day obliged to leave a student as my substitute, who neglected the directions I gave him; after an absence of three hours, I returned, found the os uteri completely dilated, the membranes ruptured, and the head strongly engaged. From that time I have never interfered in such cases, and the organism has always succeeded in restoring things to their natural state. My design is not to conclude from this that we must never do anything but wait, but merely to observe that, excepting in a small number of cases, nature herself may suffice, and that a resort to bloody operations ought not to be lightly resolved on.

J. Abdominal Cicatrices.—Gibbosities and acute diseases do not become a cause of dystocia, excepting as they often do not allow the woman, without danger, to give herself up to the efforts needed for the delivery of a child; but there is another very remarkable cause of difficult labor which no author has mentioned. A strong, robust woman, pregnant with her first child, in the forty-fifth year of her age, had been in labor for forty hours, when M. Morisse sent for me to see her. The presentation was good, the head had been in the excavation for twelve hours without advancing, in spite of the energy of the uterine contractions. The skin on the forepart of the thighs and abdomen was all covered with old cicatrices, which were hard and fibrous, and confined the lower part of the hypogastrium, so that the womb was as if strangulated immediately above the pubis, and the child could not descend. I applied the forceps, and the child was brought away living.

§ 2. DYSTOCIA DEPENDING ON THE FÆTUS—MONSTROSITY.

A. Excessive Volume.—There is no doubt, says M. Dugès, that, where the child is very large, it may render a labor more tedious, painful, and distressing, especially if the passages are not soft and are small, as in a first labor; but it is not yet proved that great size in a well-formed child at full term has ever alone constituted an insurmountable obstacle to spontaneous parturition.

If it be true that Baudelocque, Chaussier, M. Capuron, &c., have seen children born, weighing near thirteen, twelve, or even ten pounds, it is, nevertheless, certain that we no longer see them reaching to the weight of fifteen, twenty, and twenty-five pounds, nor any whose length exceeds from twenty-two to twenty-three inches. But as it is an easy matter to ascertain that the head of a foetus of twenty-two inches will not be quite four inches in its occipito-bregmatic and bi-parietal diameters, it is at once evident that, even in case of extreme size, spontaneous delivery is not impossible. It should be remarked, however, that in that case the least narrowness of the pelvic cavity, especially in the perineal strait, must promptly become the cause of dystocia.

If it is true, as Trinchinetti thinks, that the bones of the cranium are hardest

when the woman becomes pregnant after thirty years of age, or, as Clarke, Bland, and Ryan pretend, that the size of a boy's head is one-twenty-eighth larger than that of a girl's, we may suppose, for the same reason, that the labors shall then be more difficult, and that the male sex ought to predominate among dead-born children. It is no longer believed that children with short necks are delivered with more difficulty than others, as *Peu* states. We may admit still less, with this author, that the child may cross its arms or legs over its neck so as to cause suffocation; nor do we believe in the arrest of the shoulders at the superior strait as a cause of dystocia, nor in strangulation of the fœtus by the contraction of the os uteri. But the fœtus may render labor difficult or impossible when it is dead. In a case met with by *M. Duparcque*, it had acquired such firmness, and its limbs were so separated, that, if it had been carried to full term, it certainly could not have passed through the natural passages. General emphysema, which *Peu* long ago mentioned, may proceed so far, and give such density to the dead child during labor, that the body is found, after delivery, sometimes double or triple its natural size, as it was in the case which I cited above.

On the other hand, the practitioner ought to know that, under such circumstances, version by the feet is never proper. Indeed, where the head presents, although its shortest diameter and smallest circumference are almost always in relation with the largest diameters of the pelvis, it is rarely that, in extracting the child by the feet, the occiput is not forced to turn over more or less upon the back, while the occipito-frontal, which would be nearly five inches long, would take place of the occipito-bregmatic diameter, and perhaps it might even be the occipito-mental that would be thus situated, and that would be at least five and a half inches in length.

The best course is to confide in the resources of the organism, and, where it is indispensably necessary to act, to attempt the application of the forceps rather than venture upon turning; and, should it be a presentation of the pelvic extremity of the fœtus, either originally or by turning, every precaution should be employed to prevent an arm from becoming locked behind the neck.

A monstrous fœtus, which is single, seldom offers great difficulties during labor. I have dissected one which appeared enormous. Its four limbs were only two inches long, and yet it weighed eight pounds. *M. Gasnault*, who obtained it, should have preserved it. *M. Suchet* relates a case in which the trunk terminated in a tail, and which had no lower limbs.

Infiltration of the integuments of the head, and sanguine tumors, sometimes evidently increase the size of the head, but rarely to such an extent as to furnish any real obstacle to delivery. *Harnier*, to be sure, has remarked that, where thrombuses and infiltrations are of such magnitude as to deserve any particular attention, by engaging in the space under the arch of the pubis, such tumors prevent the rotation movement which the head ought to execute in order to clear the inferior strait.

B. Dropsies.—1. *Hydrocephalus* constitutes a much more real, and particularly much more serious cause of dystocia; it is recognized by various signs: the finger feels a broad and tense tumor; the bones of the head are evidently separated and very movable; the dimensions of the fontanelles are very considerable; sometimes we meet with Wormian bones of various sizes in the midst of spaces that are completely membranous. As to the infiltration of the limbs and hypogastrium of the mother during gestation, ascites, hydramnios, anasarca, the lymphatic constitution, and the rational signs that have been supposed derivable from the size of the head, tongue, and forehead of the woman, they can give rise only to conjectures that are wholly useless in the establishment of a positive diagnosis. Moreover, it is necessary to take care not to be imposed upon by an accidental deficiency of ossification, by a fontanelle, by abnormal sutures, or a great degree of flexibility of the bones, and to recollect that hydrocephalus, during intra-uterine

life, is so rare that, according to Madame Lachapelle and M. Dugès, it was only met with fifteen times in 43,555 labors.

In order to comprehend the dangers of this species of dystocia, it should be well understood that serous fluids may accumulate in various quantity in the cranium, and that, if the head is soft, and its size not very greatly augmented, the mere energies of the woman, in general, suffice for its expulsion. When its size is not excessive, and the womb threatens to fall into inertia, recourse is had to the forceps, taking care to make use of a moderate degree of pressure, so as not to burst the head, nor allow of the instrument's slipping. Where the child is dead, and the head is too large to get through the straits, cephalotomy becomes a last resource, which we are obliged to employ.

Notwithstanding, I ought not to conceal that this subject has been and still is the subject of a very important question among practitioners. Where we have a certainty that the child is dead, everybody is agreed; but in the contrary case, it has been asserted that we have no right to kill it, and that it would be better to perform the Cæsarian operation or symphyseotomy. Others have objected that a child ought not to be the assassin of its mother; that, as hydrocephalous children die very soon after their birth, it would be contrary to humanity, as well as to morality, to sacrifice a sound and healthy woman for a being whose existence is so precarious. These reasons are, in my opinion, of the highest authority; for although, as M. Dugès asserts, it be true that a slight degree of hydrocephalus ought not necessarily to occasion the death of the child, does not always prevent its viability, and may sometimes be cured, it is equally certain that in case the head is not so large as absolutely to require the operation, and that, where even the disease is so advanced as to render the delivery impossible, we have no ground to rely upon the viability of the child. But how is the liquid to be evacuated? Should it be done with Smellie's scissors, Stein's *perce-crâne*, a common bistoury, or is it better, like MM. Maygrier and Dugès, to be content with a simple trocar? Since, according to Holbrook, Vose, &c., the puncture has been successfully performed after birth, and as large lacerations are not required to give issue to the serum of hydrocephalus, I perceive no inconvenience likely to arise in pursuing this last-named course, inasmuch as it at once satisfies the indications of prudence and the wants of practice. But if the head should not be thereby emptied sufficiently to render its escape easy, I should not hesitate about plunging one of the other instruments into the cranium.

After the operation of cephalotomy has been performed, the contractions of the womb generally suffice for the expulsion of the head; but if this should not be the case, recourse is had to the forceps, to turning, or to the crotchet.

2. *Spina bifida*.—I do not know that *hydrorachis* has ever proved to be a real obstacle to the termination of a labor. It is a dangerous disease to the fœtus, and that is all; besides, nothing could be easier than to empty the tumor by pushing a trocar into it, should it appear to interrupt the progress of the labor.

3. It is not very rare for *ascites*, and particularly for *hydrothorax*, to be of such extent as to furnish considerable obstacles to the delivery of the child, as appears from the remarks of Baudelocque, M. Lamouroux, and M. Dugès. Mauriceau, who has often observed it, and who likes no other method than the puncture of the abdomen, reports a remarkable example which occurred at the Hôtel Dieu. A student and the principal *sage-femme* could not deliver the child. The surgeon-in-chief pulled away the head and the arms, but succeeded no better. Mauriceau opened the abdomen and brought it away without difficulty. Peu mentions a case in which the abdomen burst during labor. The observations, 322, 333, of De la Motte, prove also that ascites of the fœtus may render labor very difficult; and Lemoine, who says that he can extract the child without puncture, must have seen a very small number of cases. If there is only one quart of liquid, as in the case observed by Moreau, the delivery may undoubtedly take

place, and Portal has seen a child born with an enormous abdomen; but when the peritoneum contains from twelve to fifteen quarts, as M. Petit-Mangin has seen, the puncture is indispensable. In Herpin's case, after having decapitated the fœtus, it was necessary to employ the crotchet to extract the trunk. In all cases, those lacerations and eviscerations that were practiced by Deventer should be avoided, as well as the mode recommended by Mauriceau, Levret, and Barbaut, of perforating the navel or the neighboring parts with the finger. Simple punctures, made with a trocar or a bistoury, always suffice to produce the effect which it is desirable to obtain, whether they are made directly into the abdomen, or whether, as recommended by M. Petit-Mangin, they are made through the diaphragm.

C. *Different Tumors*.—Solid tumors developed upon certain parts of the trunk, or any decided deformity, like the case related by Baudelocque, and another one published by M. Nivert, might require some peculiar attention, or even render delivery wholly impossible. Cases of this sort are particularly untoward, inasmuch as it is, generally, quite impossible to ascertain the circumstances until after delivery. Thus, in the case that fell under M. Nivert's notice, the fœtus had a very solid and projecting gibbosity which lodged above the pubis; the forceps was applied, but without effect, for it became necessary to empty the head; still, it was only by means of the crotchet and by employing the utmost strength, that he succeeded in extracting the trunk of the fœtus. Who could have suspected the existence of such an obstacle? and even had it been understood, what could have been done? Ought turning to have been attempted? Would any advantage have been derived from pressure suitably applied to the lower part of the hypogastrium? It belongs to future experience to solve these questions. Peu speaks of a tumor twice the size of the head, which, although situated at the point of the sacrum, rendered the labor very difficult. F. de Hilden mentions one, of which an account is given in a letter from Screta, which occupied the back of the neck, having the appearance of a second head; another is given in the *Mémoires* of the Academy of Sciences, and another was met with by Madame Legrand, which was also attached to the neck, and was as large as the head of a new-born infant. M. Chalmer cites a case in which a similar tumor existed on the back of the neck, and another still more singular is reported in the *Gazette* of Seine-et-Oise. There existed in the substance of the abdominal walls an enormous cyst, which for a long time arrested labor, and which it became necessary to puncture. That spoken of by M. Ozanam occupied the front of the pubis, and contained twelve pints of fluid. It burst spontaneously, and the child was born alive. That on the sacrum of the child, mentioned by M. Wardrop, measured but fourteen inches, and must have been less embarrassing. Those mentioned by Van der Wiel and Tulpus, and which were situated on the loins, were not of sufficient size to present any great obstacle to parturition.

D. *Multiple Fœtuses*.—The simultaneous presence of several fœtuses in the womb is far from always being a cause of dystocia, especially when they are independent of each other, and are each enclosed within a separate amnios. But this is not the case where they are contained within the same set of membranes, or have contracted any adhesions that compel them to present simultaneously at the straits of the pelvis.

1. *Twin monsters*.—In the latter case, the union of the children may be in very various degrees. Sometimes they are connected together by a very circumscribed point upon the inferior, middle, or superior part of the back, sometimes by almost the whole back, side, or front; at others they are joined at the head, or placed end to end at the breech. The fusion is in some cases much more complete: or, there may be only one single trunk to two heads and two or four arms; or, on the contrary, there may be only one head to two trunks, with limbs more or less completely isolated. Bicephalous monsters are a more com-

mon variety. We may find many examples in the scientific collections, besides that which Rhodion figured, and which differed very little from the famous Ritta-Christina; that which Peu is said to have dissected with Emmerex; that whose skeleton M. Worbe has deposited in the Museum of the Faculty; that of M. Lavielle, which was delivered by the feet, and which had three arms; that of M. Ratel de Bourbourg, where it became necessary to remove one of the heads; and that observed by Bagard of Nantz, which was seen by a number of persons.

A single head to two bodies has been also met with, although less frequently. In the case mentioned by M. Lavielle, the two fœtuses were so united as to form only one body. That which M. Villette de Compiègne relates was double at the pelvis, with a single head. The same was the case with that of Madame Heu. Hastings saw one without limbs, although the ossification of the cranium was advanced and the body large. Peu says that he has seen one which, except the head, resembled a waterfowl prepared for the spit. M. Gasnault and myself dissected one which was very large, although its limbs were only rudimental. De la Motte described a similar one, in which the bones of the vault of the cranium were also wanting. Here the size of the head or trunk only interfered with delivery, for there was no inequality which could serve as an obstacle.

A child without eyes, as in M. Buzairiès' case; one with one eye, as in that of M. Duane; or with a prolongation like an elephant's trunk, as in that of M. Clausure; or with a deficiency of the bony vault of the cranium, as in that of M. Lecadre; or with the insertion of the placenta on the forehead and absence of the bones of that region, as in those of Châteaurenault and Costallat; or with a nose formed like the bill of a parrot, and having the appearance of the male sexual organs on the forehead, as in those which Peu and De la Motte cite, cannot render delivery impossible. The same may be said of all cases of acephalous or anencephalous fœtuses, of monsters from want of intestines, as those seen by Nel, Tacheron, Montault, Clairat, and Bizot, which monsters, nevertheless, sometimes require assistance with the hand, as it has been observed that they present more frequently by the pelvis or trunk than by the head.

When they are united at the abdomen or front part of the chest by means of a band, as in the figure given by Fournier, and in the case of the Siamese twins at New York, the difficulty may become very great, although quite frequently they are delivered without any assistance, as we see by the case of M. Boisson, that of M. Scoutetten, and that also of M. Berry. This last physician speaks of two little girls who lived three years, who had small-pox together, who were both purged by medicine given to one, and who died at the same time.

Those which are joined back to back, as Bouthier and Norman have seen, or at the side, as Bouthier has also seen, may sometimes be delivered without very great difficulty, as the case reported by M. Bry proves, in which the posterior trunk was first disengaged, then the anterior, the posterior head and then the anterior.

The signs of these monstrosities are so vague that they really do not deserve to be repeated in this place; there can be no certainty, nor even probability, of their existence, except in so far as certain portions of the fœtus are already emerged; and even then it is for the most part very difficult to characterize the nature of the monster we are about to receive.

There are enough cases of monsters from excess of parts, born living and under the mere resources of nature, to warrant us in not acting too hastily in such circumstances. If a double fœtus with a single head presents by the vertex, or even by the feet, provided the conformation of the pelvis be good, the delivery will not require any particular interference; the same would be the case with two fœtuses attached to each other by their extremities, either the head or breech, as is proved by the cases mentioned by Meckel, Palfyn, Duverney, Home, Lavielle and Villeneuve. Further, M. Dugès saw one born without assistance, though it

was completely double, at full term, and of large size. But, again, the observations of Plenck and Smellie demonstrate that monsters of a much smaller size have, on more than one occasion, rendered delivery very distressing, both to the mother and the accoucheur, particularly where there was a great desire to have them born alive.

When there are two heads to a single trunk, provided the one that is in front succeeds in engaging first, the second may follow without any extreme difficulty, and being forced downwards, they will clear the vulva almost as easily as if there had been but one. That cited by M. Gravis had two heads and two trunks, but was still delivered spontaneously. If one of the heads is situated on the sacrum, and if it happens to be hydropic, as it was in Peu's case, its extraction may become very difficult. They may be united pelvis to pelvis, in such a way that the lower limbs may be placed transversely, as in M. Moreno's case. Baudeloque also gives a case in which a fœtus, which was completely double, was delivered without assistance, and M. Chevreul has himself seen three or four cases. When such a monster presents by the feet, the posterior head ought to descend first into the excavation, whilst the other remains above the pubis; the woman may exhaust herself in vain efforts, and the intervention of the accoucheur may become indispensable. But, previously to operating, several questions present themselves to the practitioner; is the monster dead, or is it living? In the latter case, are we to act upon the woman, or upon the fœtus? I know that a double child, or one that is simply bicephalous, may live and grow after birth; that several have lived for seventeen or twenty years, and even to a very advanced age; that a fœtus seen by M. Dent, that was born in the East Indies, and which died at three years of age of the bite of a serpent, grew as regularly as the best formed child, though it had two heads united together at the vertex. Who is unacquainted with the history of the monster noticed in China, and of which an account was laid before the *Académie des Sciences* last year by M. Geoffroi Saint-Hilaire. It has indeed been said that anencephalous children have been born alive. M. Spessa, among others, maintains that a fœtus of this kind which had neither cerebrum nor cerebellum, nor medulla oblongata, cried and breathed for eleven hours. Peu is content with stating that in his case the child lived a full quarter of an hour. In Van der Wiel's case, the fœtus lived twenty-four hours, but an excrescence which took the place of the brain sufficiently explains it. We cannot understand how a fœtus, which has no encephalon, with alteration of the medulla oblongata, can live twenty-four hours, as M. Hélie, of Nantes, says that he has witnessed. I do not wish, therefore, to maintain that such beings are of necessity unlikely to live; but is it true that they have the same rights as any other fetuses to our care and solicitude? Is their life so valuable that, with the view to, and under the few chances of preserving and raising them, we are bound to perform on the mother a most dangerous and too commonly fatal operation? I am aware that by the Cæsarian operation we may save the child, and not cause the mother to perish; but is it not well known that one-half of the women who submit to it lose their lives, and that almost all the fetuses soon undergo the same fate? I do not hesitate to say, and I believe in conformity to the sacred laws of humanity, that, if I were obliged to choose between hysterotomy and the murder (*meurtre*) of a monster, I should not vacillate a moment; I would sacrifice the fœtus. Happily, the skillful accoucheur can scarcely ever be subjected to this distressing alternative. Manœuvres well arranged, and performed either with the hand, the forceps, or the lever, almost always succeed in disembarassing the woman through the natural passages, without injuring the child.

The turning and delivery by the feet, whether the child be exactly double or merely bicephalous, living or dead, and at any stage of gestation, will suffice, in nine cases out of ten, at least, where there are no other causes of dystocia present.

It ought, therefore, to be tried in all cases. However, if one of the heads should be already so far engaged that it could not possibly be returned, we might, after the manner of Plenck, try the application of the forceps. Should the forceps prove insufficient, there would be a last resource, the removal of the parts that had descended into the excavation, that is to say, of the head alone, or the head and arms; after which the feet could be brought down so as to deliver by turning, as was done by M. Retel, in 1818, in such a case. There would be less to fear in such a case, as the fœtus generally dies long before we are reduced to this extremity. The difficulty of separating two children united to a certain extent, outside of the womb, and the danger to which by such operations they are exposed, clearly show how imprudent it would be to follow the advice of Smellie, and attempt to do so, in the interior even of the uterus.

2. *Twins*.—If twins occupy each their own membranes, as is almost always observed, they are born separately without interfering with the progress of labor, except that sometimes there is a considerable interval between them. In Dillenius' and Febrius' cases, the second child did not escape for two days after the first. In Courtivron's case, the interval was ten days, in Guerin d'Illiers' it was eight days, in Charles Gerard's it was three, and in Burton's it was only nine hours. Frequently the first child is expelled almost without pain, as in one of the cases observed by Millot. The second being often transverse, or presenting badly, as Girard of Lyons has well remarked, may easily cause a suspension of the labor after the birth of the first. To introduce the hand for the delivery of the second child, without waiting for the contraction of the uterus, as recommended by Mauriceau, De la Motte, Deleurye, Burton, and Smellie, would be in my opinion bad practice, at least when no accident demands it. When every thing goes on regularly, it is better to incite the contractions of the uterus by the usual means, and even to use compression on it, as Millot recommends, and then to wait. If the woman is not so quickly delivered in this way, she suffers less, and the child runs evidently less risk.

When, in twin pregnancy, two fœtuses present simultaneously at the straits, the intervention of art almost always becomes necessary, and sometimes indispensable. If it be found that both the heads tend to engage at the same time, which is excessively rare, it is proper to push up the most movable one with the fingers, so as to let the other advance first; the same procedure may be adopted for the feet, the knees, or breech; if the children present across, or in any other way except by the head or the pelvis, recourse must be had to turning; but it may happen that one of them comes by the head, whilst the other descends by the feet, and that upon reaching the superior strait the chin of the latter hooks in with the chin of the former, so that the two heads at length become immovably fixed, each opposing an insurmountable resistance to the other, and constituting one of the most embarrassing cases in the practice of midwifery; neither turning nor the application of forceps can be thought of; even the Cæsarian operation itself, which has been recommended by some authors, would not always enable us to disengage the fœtus; so that the detrusion of the one that is without, constitutes almost the only resource left to us for the safety of the mother and one of the children. The opposite practice and even the resources of the organism may, however, sometimes succeed. In a case cited by Merriman, and published by Clough, the uterus expelled the two heads one after the other. Burns speaks of two similar cases observed by Allan and Fryer; M. Dugès relates another; and Eneaux, a surgeon of Dijon, says that he once succeeded by applying the forceps to the first head which descended (see the articles *Compound Pregnancy*, *Fœtus*, *Version*, and *Delivery of the Placenta*).

E. *Mal-presentations*.—It has been seen in another article that the presence of one of the extremities of the occipito-coccygeal diameter of the fœtus at the superior strait is one of the first conditions of eutocia. All the cases in which any

other point than the head or pelvis presents ought, therefore, to be classed among the cases of dystocia. I will add that to them should be conjoined all the deviated positions of the head or breech.

1. *Deviated presentations of the head.*—Under this title, I comprise the positions of the sides of the head, of the ears, or of the temples, admitted by Mauriceau, Deventer, De la Motte, and Baudelocque; and those of the occiput, in so far as they really exist, as was understood by the last-named author: as to the forehead and face positions, since they do not, in general, prevent a labor from terminating without assistance, I shall say nothing about them in this place.

Positions of the *occiput* or upper part of the nucha are rare, and scarcely occur except in very decided anterior inclination of the womb. Then the vertex may be turned towards some point on the circumference of the pelvis instead of corresponding to the centre of the strait. Should pushing the womb backwards, keeping the woman on her back, or the mere efforts of the organism prove to be insufficient to re-establish the natural position, it would be necessary, with the fingers, the lever, or one of the blades of the forceps, to hook the upper part of the cranium, and draw it down towards the centre of the excavation, upon which the labor would return to the natural order.

The *lateral* positions of the head, being nothing more than slightly modified positions of the vertex, are the same in point of number with them; they are marked by the presence of the ear, of the angle of the jaw, or the parietal protuberance: they are distinguished from each other by considering to which point of the strait the posterior edge and lobule of the ear are turned; they are, moreover, rare, and generally end in conforming themselves, spontaneously, to the corresponding positions of the vertex or shoulder.

We ought, consequently, to trust to the efforts of the womb until the os uteri becomes sufficiently dilated; if they then persist, we must, as in positions of the occiput, endeavor to bring back the vertex to the centre, by means of the fingers, the lever, or one branch of the forceps; or, where it is a shoulder that is too far advanced, the child should be turned and delivered.

2. *Deviated breech presentations.*—The pelvis may, like the vertex, incline in any direction, and give rise to what have, by the authors, been denominated positions of the hips, sacrum, front of the thighs, and genital organs. Produced sometimes by the inclination of the child no longer agreeing with the vertical axis of the womb, and sometimes, which is more common, by obliquities of the uterus, the deviated positions of the breech do not always prove insurmountable obstacles to spontaneous delivery. Nature often succeeds, alone, in transforming them into direct positions, so that, if the labor progresses in other respects regularly, the assistance of art rarely becomes necessary.

However, we must not, for fear of acting unnecessarily, remain inactive under accidents or sufferings which it would be easy to prevent or alleviate by a skillful manœuvre. Whilst the membranes continue unruptured, all we ought to do is to restore the womb as far as possible to its natural attitude, either by pushing it with the hand into the axis of the strait, or by causing the woman to assume such or such an attitude, according to circumstances. But if, the membranes being ruptured, the os uteri, although soft, should dilate with exceeding slowness; if the pains should be directed with great force towards the *loins*, or the strength appear likely to be exhausted; or lastly, should any accident supervene, the accoucheur ought to wait no longer: he should try to reach the deviated part with his fingers, or even with the lever, if it be the hip or sacrum, and restore it to the centre of the pelvis; or he may proceed at once to seek for the feet or the knees.

3. *Presentations of the trunk or body.*—It is incontestable that the trunk sometimes presents at the superior strait as well as the head or pelvis; this has been admitted by practitioners in all ages, and has been a thousand times

PLATE VIII.

PRESENTATIONS OF THE BODY.

FIG. I.—OCCIPITO-POSTERIOR POSITION, THE BODY HAVING ESCAPED.

FIG. II.—DORSO-PUBIC POSITION OF THE LEFT SHOULDER.

FIG. III.—DORSO-PUBIC POSITION OF THE RIGHT SHOULDER.

The commencement of spontaneous evolution. The shoulder (*a*), firmly pressed down, rests on the left side (*b*) of the pubic arch, and allows the chest (*c*) to descend by degrees to escape through the vulva (*d*).



Fig. 2.

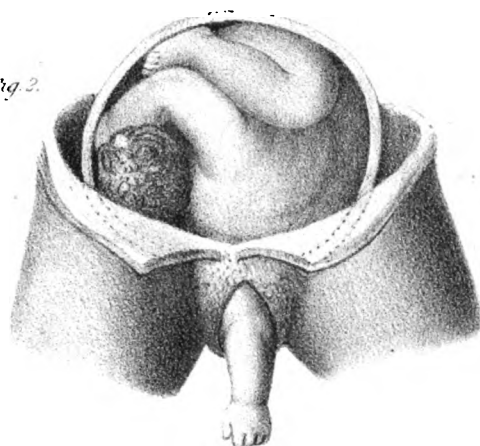


Fig. 3.



proved by observation. But is it true that these presentations exhibit shades so various and multiplied as has been asserted by the authors? In the first place, is it possible for positions that are frankly transverse, to take place either before or after the discharge of the liquor amnii, when the fetus is at full term and well grown? For that end it would be required that the transverse diameters of the womb should exceed the perpendicular; but even should such a disposition exist before the commencement of labor, can we conceive that it could maintain itself under the contractions of the gestative organ? Would not those contractions necessarily compel the head or the breech to descend towards the os uteri? Mauriceau, Deventer, Smellie, Röederer, &c., have given drawings representing such positions, it is true; but none of them is said to have been taken from nature, and a mere glance suffices to satisfy us that they are all fancy-pieces. If the ideas of these authors have in our own day been reproduced, with additions, is it not rather in order to be conformable to the notions of the ancients than from direct observation? Could Solayrès and Baudelocque be fit judges of a question never previously agitated, particularly as they had such motives to retain it as it had been laid down, in order to magnify the importance of a classification which in a great measure constituted their reputation and their glory? I desire that here, as well as in the succeeding articles, no one will misconceive of my intentions, and that I may not be charged with want of reverence for so many celebrated names; I merely express my doubts, and do not pronounce judgment; but, were it necessary to combat the opinion and the arguments of those accoucheurs, whether ancient or modern, who have admitted the existence of transverse positions, by means of authorities not less respectable than they are, I would suggest, without any allusion to my own experience, that, out of more than forty thousand cases noticed by Madame Lachapelle, and twenty thousand mentioned by Merriman, not one of these presentations was observed. Nægele, who has performed version six hundred times, Dewees, M. Deutsch, director of the *Maternité* of Dorpat, Blundell, and Riecke with his 220,000 accouchements, have also made no mention of it.

Is it, then, demonstrated that the child may present either of its three principal surfaces at the entrance of the pelvis, and that inclined positions of the side have not been mistaken for positions of the dorsal or abdominal surface? A multitude of cases are found in books, which, if taken according to the letter, would lead to an affirmative answer to these questions; but, upon analyzing them with some degree of care, they are soon found to be accompanied with details not sufficiently circumstantial to serve as incontrovertible proof of what their authors have averred to be the facts. According to Madame Lachapelle, positions of the anterior and posterior regions never do take place, and those of the side are the only ones that we can conceive of, except it be in some abortions. She maintains that positions of the dorsal surface would not fail, under the influence of the uterine contractions, to be soon transformed into positions of the shoulder, should they not result in being reduced to some positions of the head or pelvis; that those of the abdominal surface would require an inversion of the occiput, of the lower extremities and spine, incompatible with the life of the fetus. For my own part, I think that the *back* and the *anterior* surface of the fetus may present at the superior strait; that these positions have been observed; that proofs of them are contained in the works of Deventer, De la Motte, &c.; but that they are rare, and differ so little from the positions of the side as to require only very slight modifications in the manœuvres appropriate to these latter. P. Dubois, who adopted my method of classifying positions of the head, but who has since discarded it, to follow that of Ould, Titsing, and Nægele, also adopts the preceding ideas of the presentations of the trunk; only, in place of confining himself to those of the shoulders, he maintains, as I think wrongfully, that it is the side of the chest which occupies most frequently the centre of the

superior strait. I am surprised at so sudden a change. M. Dubois said, in 1832, "In fine, all possible relations of the head with the superior strait may be reduced, as we have done for ten years, to two positions; one the occipito-anterior, and the other the occipito-posterior position." Besides, he states, on the contrary, that the pelvis ought to be divided into two lateral halves, and that there is one left occipito-lateral position and one right occipito-lateral position.

Baudelocque admits, further, that in the posterior surface we should distinguish the occiput, the nucha, the back, the loins, and the posterior surface of the pelvis; and that the anterior and lateral surfaces require the same subdivisions. But while we admit that the fœtus may, indeed, present by these different points, it would be, nevertheless, useless to adopt such numerous positions, for they are of no practical application, overload the memory without any object, and only serve to discourage the student.

The simple good sense, and the observations of Denman and Madame Lachapelle, prove that the nucha cannot maintain itself at the superior strait; that it would soon give place to the head or shoulder; and that positions of the hips or loins could not fail to be soon transformed into a direct or inclined position of the breech. We see that Mauriceau, who speaks of presentations of the back and belly, and who has given plates of them, possessed no conclusive facts on the subject. That which Rhodion says proves that he never met with them. Portal only said that he had seen the abdomen present because he felt the umbilicus. The two observations on the presentation of the nucha or back, given by De la Motte, are little else than simple assertions. He reached the feet too easily in the so called presentation of the belly, for us to place full confidence in them. Smellie, who has given careful plates, does not say that he has even seen it. Viardel's case was more obscure, and the placenta, which was over the orifice, may have imposed on him. Deventer, who admits and figures the presentations of the back and belly, cites but two examples. In one case, the hand presented at the same time, and in the other the shoulder was so near the orifice that it was difficult, according to him, to tell whether he had to deal with the shoulder or back. It is then evident that a position of the abdomen has often been supposed present, when, in reality, it was only an inclined position of the breech, feet, or knees, complicated with one of the arm, or with a premature escape of the umbilical cord.

Madame Lachapelle thinks that the throat would not, under the contractions of the womb, be long permitted to remain at the orifice, for the pains would bring the face there far more easily. I am in possession of no facts to militate against the opinion of this author, and know that on this point many practitioners might have been deceived by the touch; however, I can conceive that, where the occiput is very much reversed backwards, the chin may lodge upon some part of the pelvic circle, and compel the anterior part of the breast and neck to fix itself at the orifice, while the breech, although retaining its natural relations to the abdominal members, remains at the fundus of the uterus. In order, therefore, to avoid the reproach of abandoning one extreme for the purpose of falling into another, I shall admit the positions of the back, and of the anterior face of the thorax, as at least possible occurrences.

As to presentations of the side, they are too frequently met with for their existence ever to have been the subject of a doubt; but the classification of Baudelocque, although recently brought forward again in America by Dr. Dewees, one of the most distinguished accoucheurs in the New World, here requires the same reform as in the anterior and posterior surfaces. The sides of the neck form too deep a notch betwixt the shoulders and head not to yield a passage to one of these parts; the side of the chest being less round, and particularly not so smooth as the point of the shoulder, could not hinder the latter from engaging in the os uteri; lastly, the flanks would soon bring about a hip or breech position.

Inclinations of the womb or of the straits of the pelvis, sudden and irregular movements of the fœtus, certain attitudes of the woman long persisted in, are the principal causes to which, in the present state of our knowledge, we may attribute the bad positions of the fœtus.

Hippocrates was the first one to say that the fœtus in utero was in some degree situated similarly to an olive or a cork in a long-necked bottle; that in order to escape from the genital organs, it must present one of the ends of its long diameter; and that any other presentation was dangerous, rendered delivery impossible, and imperiously demanded the assistance of art.

This doctrine, though republished by all the authors since the time of the father of medicine, and against which no one has made any objections even in our own days, is not free from all doubt. The comparison instituted by Hippocrates is not correct, except in so far as the fœtus remains in a normal position. In the other cases, the child represents neither an oval nor a cone placed transversely or obliquely. Whilst the head turns on one of its sides, behind or in front, whilst the shoulders, the breast, or the back tend to engage, the remainder of the trunk continues, notwithstanding, in due relation with the vertical axis of the uterus, whenever the contractions are somewhat energetic; and thenceforth the fœtus is in no respect like a cork that presents crosswise in the throat of a vial. I think, then, with Barton, that purely transverse presentations are almost impossible, and that the head, shoulders, or breech, always tend towards the fundus of the uterus.

No doubt the hand of the accoucheur is often necessary, and even indispensable, when it is neither the head nor pelvis that presents; but it is also certain that the organism alone would, in many cases, triumph over this obstacle were the labor left to itself. People have in practice reasoned as if the positions of the trunk, when once determined, could never change. But daily observation proves that the different points of the fœtus, though very remote from each other, may, during a labor, present alternately at the orifice; that positions of the back or shoulder may be converted into positions of the head or breast; that positions in appearance the most unfavorable might sometimes be replaced by normal positions, were all accoucheurs *sufficiently well informed to know how to wait*.

F. Spontaneous Evolution.—Those passive movements undergone by the fœtus in utero, which Denman has mentioned under the title of *spontaneous evolution*, and which M. Murat calls *spontaneous version*, have been carefully observed by Madame Lachapelle, and noticed by Garthshore, Martineau, &c. Neither were the ancients wholly unaware of them, since they advise that, for the purpose of bringing the head back to the strait, the woman should be shaken, or assume certain positions. Most modern authors have also remarked them, since they have laid it down as an established rule that the position of the child, while still enclosed in the membranes, is so variable that, in order to fix it, it becomes necessary to rupture the ovum, choosing a moment when the head corresponds to the centre of the pelvis; but upon this, as upon all those phenomena that have not been the objects of special study and attention, little thought has been given to the practical consequences that might follow it.

The value and the mechanism of spontaneous evolution are still so badly understood, that I shall be obliged to treat of them here in some detail. We may admit two varieties or two kinds: The one comprehends all the cases in which the fœtus really changes its presentation, and merits rather the name *spontaneous version* than *spontaneous evolution*. The other belongs to those cases in which a part, at first at some distance from the superior strait, comes down and engages in it without displacing that which at first occupied it.

a. Spontaneous version.—In the first variety of version, the only one which is well understood in France, the fœtus changes its position entirely. Some-

times the head rises up while the breech descends; at others, the pelvis leaves the neighborhood of the strait, and allows the head to become engaged.

We may therefore establish two varieties, one for the head, and the other for the breech, and describe separately spontaneous *cephalic* and spontaneous *pelvic* version, as in this way the details may be best studied. Ficker has gone so far as to mention a presentation of the feet, which was converted into one of the head.

It is to this variety that Denman and Madame Lachapelle have referred the facts which they observed, though evidently wrongfully. They did not meet with it except in the first stage of labor, or soon after the rupture of the membranes.

Although the spontaneous version takes place most frequently where there is a superabundant quantity of liquor amnii, where the fœtus is not large, where the womb is very much inclined, or where the pelvis is badly formed, (for Denman says that the fœtus often changes its place in women who are badly formed,) it may, nevertheless, be sometimes observed in the directly contrary conditions. Although it more commonly and easily takes place before the rupture of the membranes, it is, notwithstanding, found to occur after the evacuation of the waters. A young woman, in her second pregnancy, was admitted into the hospital of the *Ecole de Médecine*, at ten A. M. in the month of August, 1825. The os uteri was then but little dilated; nevertheless, I discovered that the shoulder presented in the second position. The waters were not discharged until three o'clock in the afternoon; four students, who were already well advanced, touched and recognized the presence of the shoulder, as I had done. I did not wish to bring down the feet; the pains were neither very strong nor very frequent, and I had some confidence in the assertions of Denman. At eight o'clock, the shoulder was found to be evidently moved towards the left iliac fossa, and I could easily feel the ear to the right. At eleven o'clock, the temple was nearly in the centre of the orifice: the energy of the contractions was greater, and the os uteri completely effaced. At midnight, the occiput came down, and in the space of an hour the child was expelled in the right occipito-acetabular position. It is therefore inexact to say, with Mauriceau, that, in presentations of the side of the head, the child's neck *would be broken before* it would descend.

It appears to me that the explanation of *spontaneous version* is an easy matter: the head of the fœtus, which is its most solid, voluminous, and regularly rounded part, and on that account its most slippery portion, naturally tends towards one of the two extremities of the great diameter of the uterus, and towards the cavity of the pelvis; if, under the influence of any cause, it has assumed any other position, it is very natural that, when pressed by the organ in which it is enclosed, it should gradually, and without much difficulty, reassume the situation it occupies when in its natural circumstances. When the womb contracts, if the fœtal ovoid is well situated, it becomes compressed equally in every direction; but if, on the contrary, it is in a deviated position, its extremities support almost alone the whole effort of the contraction, and but for the shoulder, which is, from its salient form, apt to be arrested at the strait, either the head or the breech would be almost always brought to the strait.

For this consequence to fail taking place, which is almost impossible, the middle of the child's body ought to correspond exactly to the centre of the pelvis, so that, of its two extremities, one should not be more disposed than the other to slide up towards the fundus, or down to the orifice of the womb; besides, the difference of the shape of the head and breech would render this equilibrium extremely difficult. There is nothing very extraordinary, therefore, in the evolution or spontaneous version of the child; it is quite a natural phenomenon, easily explained by the action of the womb, and its relations to the form of the ovum and fœtus. The mechanism of this evolution explains why the anterior and pos-

terior positions of the trunk are so rare, and shoulder cases so common. If, when some point on the dorsal or abdominal surface of the child offers at the strait, the head or the pelvis is too far removed from it to be brought back again, the pains never fail to act with a certain degree of force upon the two extremities of the bis-acromial diameter, which then becomes inclined, and one of the shoulders is soon compelled to engage in the open part of the strait, so as to form the starting-point for spontaneous evolution, properly speaking.

b. Spontaneous evolution.—We find two distinct varieties of evolution properly speaking; one of the head, and the other of the pelvis.

1. *Cephalic evolution.*—In the first variety, the head, which is at first at some distance from the pelvic circle, after awhile descends, without sensibly displacing or causing to ascend the part first engaged. The examples which have been published are sufficiently authentic to authorize me to admit it as a distinct variety. After having seen the shoulder or the upper part of the sternum fill the excavation, and even reach the vulva, practitioners have been able to convince themselves that tractions on the fœtus, or the violent efforts of the mother, are capable of causing the head to advance, and that then this part clears the pelvis little by little, descending from the neck towards the vertex, without causing the chest to leave the excavation. Fichet de Fléchy reports two cases, which place this fact beyond a doubt. Both were presentations of the shoulder. In one, the head descended, and the face escaped in front, while a *sage-femme* pulled on the arm. The other was, also, under the care of a midwife, who, not knowing how to perform version, brought down the head and ruptured the perineum by violent traction on the arm. Fichet says that he succeeded, himself, by acting in this way. F. de Hilden speaks, also, of three cases of presentation of the shoulder, which changed to that of the head; and says that his wife was in the habit, in similar circumstances, of bringing down either the head or the feet. M. Pezerat, wishing to push up the shoulder, and not being able to proceed further, withdrew his hand, and immediately saw the head descend under the influence of violent uterine contraction. The two cephalic versions performed in consequence of a presentation of the back and a presentation of the shoulder after the escape of the waters, of which M. de Roche speaks, might very well belong to this class. M. Raynaud relates two other cases of the kind. In one case, they attempted to push back the arm, and the head came down; in the other, they endeavored to act on the sternum, and the head, which was in front, engaged equally in the strait. M. Eckardt speaks, also, of a case of twins in which the second child, too far advanced in the pelvis to admit of the descent of the feet, came by the head, whilst they were drawing at the arm. Although the fœtus observed by M. Pezerat was very large, still we should look for such a termination only in cases of a moderate sized child, or where the pelvis is very large.

2. *Pelvic evolution.* *a. History.*—The second kind of spontaneous evolution, the most frequent and most remarkable of all, is that when the shoulder is fixed in the excavation, or even in the vulva, but does not prevent the escape of the child by the pelvis. Of late years, it has occupied particular attention from its having been confounded with spontaneous version. Denman was by no means the first to observe it, as is generally thought in France. I have observed, with Burns, that Schœneider had already mentioned it.

M. Mazzoni, for his part, gives to L. Mori, Brucalassi, Caluri, and especially Nannoni, who described it in 1785, in his treatise on *Delivery*, the credit of being first acquainted with it. In fact, other examples of it are found at a much earlier date. An observation of Peu, which modern accoucheurs do not appear to have understood when they attempt to turn into ridicule the operations of this author, evidently has reference to it. The two arms, together with the shoulders, reached the vulva; violent traction also brought down the forepart of the neck. A fillet

passed over the back, caused the breech to descend, and the woman recovered. Traction here took the place of the uterine effort, and the child escaped precisely as in spontaneous evolution. De la Motte reports a case which also has reference to it. The two arms and the breast advanced towards the vulva. This practitioner made unusual efforts to bring down the feet. The limbs were fractured, and, after every effort of De la Motte, the breech finally descended. Fichet de Flechy, after drawing at the armpits without success, pushed back the breast and saw the breech descend. His ordinary practice, moreover, had sufficiently familiarized him with the descent of the pelvis, in such cases, to lay it down as a rule, when the child presents across, *to pull on the hips with the fingers, when they can be reached, or on the armpits, or even on the arm, and in this way to assist the descent of the head or the breech.*

Denman, who published his first observations in 1784, says, in the French translation of his work, that thirty cases of the kind had already come under his knowledge, including no doubt those that had been communicated to him by Cogan, Patrukair, Hay, Garthshore, etc. He did not forget to remark, that only two of the fœtuses thus expelled were born alive, that of Garthshore and that of Martineau. It may be even further stated, although the details are unknown, that these two cases must have belonged to the first kind of evolution, to spontaneous version.

Cases of spontaneous evolution, of which M. Schweighæuser cites an example, have been so multiplied since Denman, that it is now no longer possible to neglect them. Besides those which Mr. Burns refers to from Outwait, Simmons, Perfect, and Gardiner, two are due to M. Champion, three to Mr. Ingleby, one to Mr. Shearly, one to Mr. Brown, one to M. Schneider, two to Mr. Ryan, one to Mr. Cusack, one to Mr. Gregory, ten to M. Riecke, and three to Siebold, without counting those that I shall refer to hereafter, and those which belong to Madame Lachapelle.

It is, nevertheless, quite a rare phenomenon. The ten cases of M. Riecke were taken from 220,000 deliveries observed in Wurtemberg, and Mr. Burns says he knew of but two at Glasgow out of a population of 202,426 inhabitants. Nevertheless, similar cases have also been observed by MM. Meissner, Flamm, etc.

b. *Mechanism.*—M. Busch explains evolution as Gooch does, whilst M. Pacoud, who saw two cases of it, says that the children are born dead, and he does not appear to understand the mechanism of this mutation any more than Madame Lachapelle. The idea which this latter author, and even Denman himself, have given of it, is erroneous, inasmuch as she only explains the evolution of the first kind, or exceptional cases of the third, and not the most of them. M. Guillemot, the first of us who succeeded in explaining its true mechanism, proves, from the very cases of these authors, that the head and the arms do not recede in spontaneous evolution, as they thought, while the breech descends. Attentive observation to what passes in such cases, and experiments on the dead body, show that, 1st, the shoulder commences by sinking as far as the vulva, so that the side of the neck and the superior surface of the clavicle, or of the acromion, rest on one of the sides of the inferior strait; 2d, the nape or the front of the neck, with the upper part of the breast, may do the same, when both arms have escaped either anteriorly or posteriorly; 3d, the contractions of the womb and the muscles acting then on the pelvis, which is more elevated and alone movable, without allowing the head to recede, force the breast to become flexed, to descend by flattening itself, and present at the inferior strait, and then at the vulva; 4th, the fœtus, once doubled, brings the belly, pushed in the same manner into the pelvis, whilst the thorax continues to roll out; 5th, the breech following the movement in its turn engages in the pelvic cavity, by resting on one of the ischiatic notches, or by being

carried from above downwards by a kind of see-saw motion into the inferior strait and vulva, after having distended and compressed violently the edge or side of the perineum opposite to that which serves or has served for a fixed point to the shoulder and neck.

In order to understand this mechanism, it is sufficient to imagine an elastic flexible rod or spring, one of the extremities of which should be fixed to one of the sides of the excavation or straits, whilst force is applied to the other. Fixed in this way, and rendered immovable at one end, this rod or spring will not fail in yielding to the force that bears on the other, and to present its convex surface at the vulva, and in this way cause the whole to pass out. The trunk of the fœtus and the flexibility of the spine perfectly resemble such a spring. The head and shoulder form the fixed end of it, the pelvis and one of the hips the end which is to bear the force, whilst the intermediate parts roll on and pass out at the vulva.

In proof of this explanation, I can bring forward, 1st, what took place in the presence of Herder in 1803; nothing could displace the shoulder; even traction was performed, and the breech then came down: 2d, several cases of Madame Lachapelle, where evolution, long interrupted by attempts at version, was finally affected without displacement of the shoulders; 3d, the experiments tried by Monteggia, who, by pulling on the arm, saw, like Fichet de Fléchy, the breech descend; 4th, the cases and the reasons which induced Douglas at first, then Mr. Gooch, then M. Guillemot, to confute the theory of Denman; 5th, finally, my own researches.

Mr. Burns, who also admits that the head does not stir, that the breast and the hip glide over the sacro-iliac notch, distend the perineum and the vulva, appear successively and pass out gradually, maintains, moreover, that, on the side of the nape of the neck, at the extremity of the thorax placed at the superior strait, when the shoulder is at the vulva, there are but four inches and some lines. Besides, we see, in the case of Mr. Berry, that, when the shoulder was at the vulva, the head and the pelvis occupied the basin in such a way as to allow the breech to escape first. M. Wehn saw a still more remarkable case. The head, which presented first, did not prevent the pelvis from engaging and escaping soonest. In the case of Snyder and Yates, these authors remark that the shoulder was placed behind the cotyloid cavity; that version was impossible; and that, from violent uterine contraction, the pelvic evolution took place, without the shoulder receding. The same thing occurred in the case of Mr. Shearly, and in that of M. Champion, who had made the remark long before the theory of Douglas and Gooch was known in France. M. Schreiber also says that, in one position of the shoulder, we perceived, after having sought in vain to reach the feet, the breast, the belly, the breech, and finally the pelvic members, descend successively.

Blundell, called to a presentation of the shoulder by a surgeon who had long tried version, saw the child escape by the breech at the expiration of ten minutes, and says that, in another case where two surgeons and he had failed, the evolution by the breech took place in less than an hour.

M. Pezerat, who also reports a case of spontaneous evolution, not having reached the woman until after the birth of the child, has no more right to embrace the theory of Gooch than Denman's; but that of M. Guillemot is more conclusive, as this observer had satisfied himself of the presence of the shoulder before the evolution had commenced. M. Ricord has published a still more important observation of spontaneous evolution, inasmuch as the author reports it without having questioned the scientific or practical value it might possess. The child descended double by the back, as far as the excavation. Every attempt at version was useless!—nothing could displace it. Contractions more and more violent caused the pelvis to advance, and the breech and thighs were seen to escape successively. This case proves, moreover, that presentations of the

shoulder are not those alone which admit of spontaneous evolution. M. Mazzoni also says he observed it in a case of presentation of the back; and *Peu's* case, like that of *De la Motte*, shows that the same may occur with the sternum.

It is true, as *Denman* himself admits, that this kind of spontaneous evolution is almost invariably accompanied with the death of the child; that the cadaveric softening and the flexibility which follow the cessation of life in all the organs favor it considerably; but we should be wrong in concluding, with *Blundell*, that the death of the child is necessarily the prelude, and not the effect of this phenomenon. *M. Busch*, who also insists that spontaneous evolution, according to *Gooch*, does not take place until after rupture of the membranes and the death of the child, is equally mistaken. The sanguine *bossé*, remarked by *M. Ricord*, by *M. Champion*, and some others at the point which first engaged, undoubtedly shows that the fœtus of which they speak had still lived long after the descent of the breast into the strait.

The following is a synopsis of the cases of spontaneous evolution that have come under my knowledge:—

1. CEPHALIC EVOLUTION.

- F. de Hilden*. Three cases—His wife was in the habit, in such cases, of bringing down the head or the feet.
 1761. *Fichet*. Two cases—Midwife pulled forcibly on the arm; he himself succeeded by acting in this way.
Schweighæuser. (T. 2, p. 19)—Breech and left hip; came by the head.
Eckardt. Second twin—The head came while he was pulling at the arm. Too far advanced in the pelvis to bring down the feet.
Meyer. (*Monteggia*—Translation of *Stein*)—Pulls on the arm; head came first.
Raynaud. Two—Tried to push back the arm; the head came down. In the other, the sternum; tried to push it back—head descended.
De Roche. Two—One presentation of the back, one of the shoulder; pushed back; head descends; cephalic version.
Picard. Two—Amputation—The head descends during a bath (*Champion, Lettre sur l'Accouchement, &c.*, p. 12, 1828).
Pezerat. One—Shoulder; unable to determine it; hand withdrawn; the head immediately engaged.
Midwife. One—(*Journal Général*, Avril 1829)—Version impossible; amputation; crotchet; the child born without assistance in the bath.
Velpeau. One—Shoulder; then the neck, then the temple; the head came down alone.
M. Dop. One—In labor twenty-four hours; waters broken twelve hours; fruitless attempts at version; child very large, and dead—20th July, 1827.
 Total, 18.

2. PELVIC EVOLUTION.

- Peu*. One—Two arms and the shoulders; traction; front of the neck; fillet over the back; breech descends.
De la Motte. One—Two arms; breast; violent effort to seize the feet; limbs fractured; breech descends.
Rœderer. One—Midwife unable to push back the arm; pulls at it; child comes double; dead.
Fichet. One—Pulls by the armpit in vain; pushes back the breast; breech descends. His practice is to pull on the armpits, the groin, or the arm.
A. Leroy. One—He has seen jolting about force the child to change position; the head to be replaced by the feet.
Schœneider. One—(*Act. hafn. tome ii. art. 23, p. 288, 1779*)—Woman who was delivered without assistance when the arm presented.

- Mori. Three—Brucalassi, Caluri, Nannoni (Mazzoni, p. 13) have seen it several times; no detailed examples. (Nannoni, *trattato d'ostetricia*, &c., edition de Santarelli, 4^o, 1790, p. 183.)
- (1773 aphorisms.) Denman. Thirty—Cogan, two; Patrukair of Lisbon, three; Kay of Leyden, one; Garthshore, living; Martineau, living.
- Outwait. Four—(New Lond. Med. Journal, v. ii., p. 172)—Simmons, March, 1791. One case; large child in two hours (Med. Facts and Obs., v. i. p. 76); Perfect (v. ii. p. 367); Burns (p. 389).
- Herder. One—(Weimar, 1803—Ed. Med. and Surg. Journal, April 1834, p. 338.) Shoulder could not be displaced, eventration; breech descends, (Med. Trans., &c. v. vi. p. 236).
- Boer. One—(At Vienna—Ed. Med. and Surg. Journal, v. iii. p. 392.)
- Kelly. One—(Essay upon the Spont. Evol., &c. 1816—Theory of Denman.)
- Briot. Two—(Stein, tom. i. p. xviii.)—Two arms; while the woman is being bled, the breech descends. Another; amputation; spontaneous delivery. A German surgeon gave him the account of it.
- Monteggia. (Stein, French translation, p. 20)—Four—Arm; whilst they were looking for the surgeon, the child was born alive; died afterwards; both arms pulled at; the breech descends posteriorly; a crotchet in the breast, two cases; experiment on the dead body.
- Douglass. One—(The arm does not go up; the breech descends—1811, 1819.)
- Champion. Two—One, his own; the other, one of his student's (p. 58); both children living, one of six pounds and three quarters; the breech, the breast, and the arm descend without the head receding, &c.
- Ingleby. (P. 126)—Three cases without details.
- Shearly. One—(Lancet, 1829, v. ii. p. 250.)
- Brown. One—(Med. Record, 8 October 1825, p. 50.)
- Schneider. One—(Arch., &c. t. xxiv. p. 286.)
- Ryan. (P. 589)—Two cases.
- Cusack. (Dublin Rep., vol. v. p. 515)—One seven months; dead.
- Gregory. (Id. p. 576)—One at term, ordinary size, a twin; the second, arm; thought of applying the crotchet; breech descends.
- Riecke. (Arch., t. xx. p. 76.)—Ten cases.
- Mad. Lachapelle. (T. ii. p. 191, obs. 1, p. 223; 2, p. 229)—Twenty cases, for the most part abortions.
- Asdrubali. (T. iii. p. 139)—Also others in the bulletin of the Society of Emulation, No. 26, p. 315; and in Bibl. Med., t. xvi. p. 410; never until after rupture of the membranes.
- Burns. (P. 391)—Two cases at Glasgow out of 202,426 inhabitants.
- Siebold. (Journal, &c.)—Three cases.
- R. Gooch. (Med. Trans., &c. 1820, vol. vi. p. 230)—One, October 1819; like Douglass.
- Bery. One—(Lond. Med. Gazette, 13th April 1833; Arch., sect. 2, t. ii. p. 115)—Shoulder; the head and pelvis in the excavation together; breech descends.
- Wehn. One—(Bullet. of Férussac, t. xiii. p. 72)—The head first; the breech, notwithstanding, came soonest.
- Snyder and Yates. One—(Am. Journ., May 1832, p. 263)—Left shoulder; left cotyloid cavity; version impossible; breech descends; arm does not go up.
- Blundell. Two—(Lancet, 1828, v. p. 284, 517)—A surgeon called; long attempt at version; pelvic evolution in two minutes; in the other, he and his friends failed; evolution in an hour.
- Schreiber. One—Shoulder; vain attempt at version; breast; belly; breech (Bulletin de Faculté, t. xvi. p. 292).
- Pezerat. One—(Journal Compl., t. xxix. p. 306)—Did not arrive until after the birth of the child.

- Ricord. One—(Clinique, t. 1, p. 58)—Back; useless attempts; breech descends.
- Guillemot. One—(Arch., sect. 2, t. ii. p. 486)—Shoulder; breech descends in his absence.
- Mazzoni. (P. 13)—One, by the back; the breech descends.
- Meissner. Flamm; Henschel; each a case. Total, three.
- Maunsell. (Ed. Med. and Surg. Journal, 8th October 1833)—Two at Wellesley in 1832; one of ordinary size; the other small, lived thirty-four hours.
- Malcolm. One—(April 1834, p. 338)—A case at term; five pounds, two ounces; nineteen inches long.
- Turnham. One—Occipito-frontal circumference twelve inches (Lond. Med. and Surg. Journal, February 1834, p. 23)—A case at six or seven months.
- Guillemot. One—A Vaugirard; born alive; particulars doubtful.
- Peyrot and Fleury. One—(Hotel Dieu, 23d April 1834)—Shoulder; arm; ergot; breast; traction on the hips; arm does not go up; ecchymosis of the shoulder; before term.
- Velpeau with M. Deligny. One—Twins—first in two hours; second, left arm; breast; head at the right cotyloid cavity; right foot at the vulva; attempt to turn; traction on the foot, breast, abdomen; breech; arm does not go up (19th April 1834, eleven o'clock in the evening).
- Velpeau with M. Carère, at Choisy, summer of 1833. One—At six months; hemorrhage; shoulder; breech descends.
- Tirman. One—Arm; woman left to herself; spontaneous delivery; recovery good (Dugès, Madame Lachapelle, t. ii. p. 207).
- Baudelocque, frère. One—Pulls at the arm; child descends; an abortion (Lachapelle, t. ii. p. 208).
- Maygrier. Midwife; delivery, &c.; repeated attempts at version for presentation of the arm; while Maygrier reposes, the child is born (communicated by M. Bazignan).
- Bocquis. Arm amputated; shoulder torn off; viscera; woman gets up; back and breech descend, &c. (Champion, p. 36.)
- Eugène Delmas. (Journal hebdomadaire, 1834, t. ii. p. 287)—Second twin; arm, shoulder, breast, abdomen, and pelvis; child alive, five pounds ten ounces; occipito-frontal diameter, five inches ten lines—bi-parietal, three inches and a quarter; length, seventeen inches; sacro-pubal diameter, four inches—oblique, four inches and a half.
- Stephens. One—(Lancet, June, 1838)—Shoulder; arm; version impossible; traction on the limb; escape of the child; head crushed.
- M. Villeneuve communicated to me, in 1834, a case similar to the one for the details of which I am indebted to MM. Peyrot and Fleury.
- Pacoud. Two cases—children dead.
- Radford. Two cases—communicated by Mr. Bryden.
- Total, 137. Dead, 125—Living, 8.

C. *Conclusions as to Presentations of the Trunk.*—To conclude, from the above details, I think it follows: 1st. That all those positions of the trunk that cannot be referred to those of the shoulder, the back, or the anterior part of the thorax, ought to be classed among the inclined positions of the head. 2d. That shoulder presentations are, so to speak, the only ones that require particular attention, inasmuch as all others are naturally reduced to them. 3d. That the child is never situated completely crosswise in the womb, and that the most untoward positions may sometimes be expected to be reduced to those that are most favorable. 4th. That there are a good many cases in which the interference of art is anything but indispensable, although the fœtus may present by neither end of its great diameter.

The *indications* to be fulfilled in cases of faulty position of the child necessa-

rily vary according to a great variety of circumstances. Until the waters are discharged, nothing is to be done. We should wait for the dilatation of the os uteri: if the uterus is obliquely situated, we must endeavor to restore it to its natural attitude; should the head project over the hypogastric notch of the pelvis, it should be pushed backwards over the edge of the strait; when the fœtus is so movable that the head, the shoulder, or some other part, comes to present successively at the orifice, it is proper, as has been said, to rupture the membranes without waiting too long, and choosing the exact moment when the head happens to be over the strait.

But, if the os uteri is already sufficiently dilated, if the membranes are already ruptured or on the point of giving way, it is important to decide at once whether or not the hand is to be carried into the womb. Denman tells us that we may dispense with doing so in a majority of cases, seeing that the womb, most generally, will bring about the *spontaneous evolution*, and that, if the child should really come down doubled, its escape would not, on that account, be wholly impossible. The French accoucheurs think, on the contrary, that we ought to act immediately in all cases; for, say they, the longer we wait the more will the womb contract, and the more difficult will it become to enter it and effect the turning.

The conduct of Denman in this case does not appear to me to be of the very wisest; by imitating him, it is true, some fœtuses that we deliver by the feet might come away spontaneously, but many more of them would fall victims to such an expectant mode of practice, and which might be saved by operating in good time. As to delivering the fœtus double, it is manifest that it must be very difficult, that it will most generally not take place at all, and that the woman will be exhausted with useless efforts, and may lose her life; that, even under the most favorable conditions of this kind, the child generally dies long before it is born, at least if we may judge from Denman's own cases, since out of thirty of them only one was born living. And so striking was the disproportion, that Mr. Walshman did not hesitate to declare, before the Medical Society of London, that Denman had done more mischief by his article on spontaneous evolution than good in all his works!

Thus, although spontaneous evolution may take place, and, rigorously speaking, some women may be delivered without it, it is nevertheless more conformable to the dictates of prudence and humanity to turn the child or apply the forceps. To this rule an exception should be made of those cases where the shoulder is not fully engaged; those where the vertex or the pelvis is near enough to the orifice to allow us to rely upon a fortunate transmutation; and, lastly, those where the introduction of the hand is so difficult that it would not be more dangerous to wait than to proceed at once to the operation.

I would add, further, that in this latter case it is better to pull on the axillæ or the arms, as Fichet was in the habit of doing, or to pass, as Peu suggests, a fillet around the flexed body of the child, to assist the movement given to the pelvis by the efforts of the woman, than to try and bring down the feet.

CHAPTER III.

OF OBSTETRIC OPERATIONS.

SECT. I.—OF TURNING.

THE word *turning* is, in tokology, applied to the act of turning the child with the hand, and bringing one of the extremities of its great diameter to the superior strait. There are two kinds of turning; in one the head, and in the other the feet are brought down first.

Hippocrates has a few words upon the subject of turning, but only of version by the head. Celsus advises that the feet should be drawn down where it is too difficult to get hold of the head, but he dares not perform this manœuvre except when the child is dead. Aetius and Paul of Egina are the only ones among the ancients who have applied the idea of Celsus to the living fœtus. Although it is mentioned in Wolf's *Collection*, and though Franco, Rhodion, and Paré have treated of it as a common practice, we must come down as late as the time of Guillemeau before we can obtain any circumstantial details concerning it. Previously to the time of this last-mentioned author, all those practitioners who were either ignorant of, or refused to adopt the operation of turning by the feet, were reduced to the necessity of bringing away the child piecemeal from the womb, after having allowed it to perish, or else to extract it with the crotchet or some other instrument, in all cases where they thought it not possible to bring the head to the strait. Besides, until then there never had been any question about bringing down the feet, except as a remedy for faulty positions, as positions of the body, for example. It is only since Guillemeau's day that it has been recommended to bring down the feet and make a complete version and delivery of the child, in cases attended with some accident, when the head presents. Videl knew, long ago, that in all mal-presentations we are obliged to bring down the feet. This must have been even then the ordinary practice; for this author, in speaking of a presentation of the arm, says he would prefer seizing the feet, *as is the custom*. Mauriceau maintained also that, "whenever the child presented badly, the surest and most expeditious way is to bring down the feet." Fournier, P. Portal, Peü, then Deventer, Amand, Dionis, and De la Motte, having held the same language, turning by the feet has been more and more employed, whilst that of the head has been almost entirely forgotten. De Saint-Germain, notwithstanding, still represents himself as a great advocate for cephalic version; whether the child presents by the feet, by the face, by the shoulder, by the breech, by the back, or by the side, he insists on bringing down the head, either by pushing back the part engaged, or by pulling down that which is above, or by shaking, or by changing the position of the woman. With the view of setting forth the advantages and inconveniences of these two operations, I shall point them out separately, after having examined carefully the precautions they require in common, and without having regard to the singular opinion of M. Ritgen, who insists, in place of version in different presentations, on gradually drawing off the liquor amnii by means of a suction pump; as if the womb, by emptying itself, could change the position of the child!

ART. I.—OF TURNING IN GENERAL.

The necessity of acting with the hand to change the position of the fœtus or assist in its expulsion having been clearly ascertained, it should be communicated to the relatives or friends of the woman, and they should be informed of the dangers to which the child is exposed.

As to the woman herself, she ought to be informed of the advantages of the operation, and of the evils of retarding it or of not performing it; but it is important that she should be kept in ignorance of the risks the fœtus is about to run, and the sufferings to which she is exposed herself. These precautions being taken, we should next think of what period of the labor we should choose for the operation; of the position most favorable for the woman and for the accoucheur, then of the position of the child; and lastly, determine which hand should be introduced.

§ 1. THE TIME FOR ACTING.

As long as the membranes remain whole, and the orifice undilated, we may wait: if the labor is difficult only in consequence of the faulty position of the child, and the woman is in danger, it suffices that the orifice be soft and dilatable; we may operate. In all cases where the membranes are ruptured, there is not an instant to lose;* however, where the womb has been for a long time contracted, where there are great irritation, heat, fever, or any symptoms of inflammation, these epiphenomena ought to be first combated by bleeding, baths, sedatives, ointment of belladonna, &c., according to circumstances. By endeavoring to overcome all obstacles, as is recommended by Maygrier, we expose ourselves to a thousand dangers, and especially to rupture of the vagina or the uterus, as happened to that accoucheur himself, in the case of a lady I examined with him, and who died. Narcotic injections of the extract of belladonna or opium, and poppy-heads, which M. Champion says he has found of service, and which M. Gendrin has since recommended, should also be tried. In arm presentations, these remedies would, however, be questionable.

Upon the whole, the most favorable moment for turning is just when the membranes are whole and the os uteri completely dilated. This period ought, therefore, always to be chosen, if possible, and if there be no counter-indication present.

§ 2. POSITION OF THE WOMAN.

Should it be necessary only to bring back the head or buttocks, in case of deviated position of those parts, to the superior strait, we might indeed leave the woman upon her common bed; or in the situation she had occupied on her little bed during the pains; but whenever it becomes necessary to seek after the head or feet at some distance from the vulva, we ought to act differently; however, the essential point on this subject is that the vulva and perineum shall be completely at liberty, and that nothing about the pelvis shall be left to interfere with the movements of the accoucheur, and that the muscles shall not require to be put in tension for the support of some other parts of the body. Aetius, Moschion, Rhodion, Peu, and Levret himself, place the woman on the side or on the belly, when they

* M. Velpeau says, "in all cases where the membranes are ruptured, there is not an instant to lose." Let not the young and inexperienced practitioner embrace this doctrine. The rule is, that we may turn whenever we can do so without violence to the os uteri. All prudent authors concur in opinion that it must never be *forced*. Gentle attempts to dilate may be made from time to time; but, as to absolutely forcing open an undilated and rigid os uteri—the attempt would be worthy of condemnation. Hence, in fact, the operation must be determined by the judgment of the attendant—always using as his watchword, *no violence*.—M.

wish to bring the feet in front. According to Celsus, we must place her on her back, across the bed, wait for the uterus to open, introduce one finger, then another, then the whole hand, and bring down the head or feet. If a hand presents, we must bring down the head; if it is a foot, we must pull on the child by it, then plunge the crotchet into the mouth, the eye, the ear, or forehead, and drag out the whole. We must not pull when the womb does not open. When the child is across, and we cannot correct it, the crotchet should be hooked in the axilla and traction made. The neck then bends on itself, and the head is thrown back. The neck is cut so as to extract each part separately. If there be only one foot, we cut away all that has escaped. When it is the breech, we must push it up and proceed to the feet.

Thus, she may be placed on her side, conformably to the precepts of the English practitioners; on the edge or foot of the bed; on the knees of some strong person, as De la Motte was in the habit of doing sometimes; on a small stool, without being prevented from fear of cold, which Burton dreaded; on the knees and elbows, as Blundell says is done in Ireland; but it is best to place her on a chair, a settee, a table, or any piece of furniture suitably prepared for her. Upon the whole, her attitude ought to be like that of a patient during the operation of lithotomy.

At the *Maternité* at Paris, and at the Strasburg Hospital, one side of the lying-in bed is placed against a wall. As soon as an operation becomes necessary, the woman places herself crosswise upon it, with pillows under her head and shoulders, towards the wall; the sacrum rests on the free edge of the bed; an assistant is placed on the outside of each leg, and charged with the duty of keeping them separate, and the legs and thighs flexed, while a third is prepared to hand anything that may be wanted during the operation. If they can be disposed of, other assistants secure the pelvis, and prevent those disorderly movements which the sufferings of the woman sometimes deprive them of the power of controlling.

The same conduct may be followed in private practice; but it appears to me better to slip the mattress down so that the folded edge may correspond to the foot of the sacking-bottom. The woman is then in exactly the same condition as before, and the assistants can more easily move round about her. It should be observed that many women are so courageous that it is not necessary to support either the legs or the head, and indeed two chairs or two stools, fixed so as to support the feet, might serve instead of assistants to hold her legs, if assistants are wanting.

There is no fixed rule as to the height of the bed; but it is well to pay some regard to the stature of the accoucheur, the degree of inclination of the axes of the straits, and perhaps also to the stage of the labor. As a general rule, I would remark, however, that the higher it is the more convenient it is, a precaution too much neglected by practitioners. The level of the navel of the accoucheur, adopted by Plenck, is quite too low, if complete version is to be accomplished. A mattress and pillows on a bureau should always be preferred when the operation offers any difficulty.

§ 3. POSITION OF THE ACCOUCHEUR.

If the bed be a low one, the accoucheur may sit down or kneel upon the floor. Nevertheless, a standing posture is unquestionably the best, and whenever there is a necessity for using much power, it should be preferred. The precept of Levret, on this subject, has long been forgotten, which was this: "The accoucheur should stand up, with his legs separated at an angle of forty-five degrees, one foot being placed forwards, and the other backwards; that he should have the spine bowed, and lean with the hand that he does not operate with upon some

solid substance.”* De la Motte says, more properly, that in preternatural labors there is no fixed position, and that you should place yourself as you can, and as conveniently as possible.

Taking off the *coat*, rolling up the *sleeves*, and putting on an *apron* has seemed too grotesque to many moderns, who think that the woman might be frightened by so many preparations, and they ought, therefore, to be dispensed with; people may declaim after this sort as much as they please in the study, but by the lying-in bed it is otherwise. Here, says Smellie, all affectation must be laid aside, and the practitioner must in every respect feel perfectly at his ease.

In fact, it is not merely for fear of spoiling it that the accoucheur ought to take off his coat, but because, unless he does so, the movements of his arms would not be free enough to permit him to manipulate conveniently, and penetrate to the fundus of the womb. As to the apron, it may doubtless be dispensed with: but what harm can it do, and why is it more frightful here than in a surgeon making his visits, or preparing for an operation?

Some cloths to put under the feet, some napkins to wipe his hands and arms when they become soiled, warm water, Cologne-water, some vinegar, and a little good wine, in case the woman should be likely to be ill, are also necessary previously to commencing the operation. Moreover, the condition of the fœtus must be attended to, its position ascertained, and the hand to be introduced decided upon.

The *christening* or provisional baptism is only applicable to a living child, and that, provided it be not a monster. Where there is ground to fear that it is dead, we should say, “*Child, I baptize thee, &c., if thou art living;*” and where there is reason to suspect it of being a monster, we substitute for *if thou art living*, the words *if thou art worthy of being baptized*. In order to baptize, some part of the naked surface of the child should be touched, if not with the fingers, at least with the water of christening, which it is sometimes necessary to inject to a considerable distance. It is seldom, however, that baptism by injection with a syringe should be practiced, which was long ago ridiculed by Peau.

This precaution, which, as is manifest, belongs to the dogmas of religion, ought never to be neglected with persons who make of it an article of faith. Whatever be his personal belief, the physician ought to respect the opinion of the families he attends, whether they agree with his own or not; and to me nothing seems more blameworthy than those pragmatical practitioners who, under pretence of reforming consciences, openly revolt against every custom that does not agree with their own way of thinking.

§ 4. TO ASCERTAIN THE POSITION OF THE FŒTUS.

The positions of the head, the feet, the knees, and the breast, having been characterized in the article on *eutocia*, I have now to attend only to those of the trunk.

Presentations of the *shoulder*, whether frank or inclined, will, if the arm have not come down, be ascertained by the rounded form of the tumor in the orifice by the presence of the clavicle, the ribs, the scapula, and one side of the neck. Here, as in the application of the forceps, and all those cases where it is important to know beforehand the precise position of the child, it would be well

* If a woman lie upon her back for this operation, the practitioner has equal access to the uterus with the right or left hand, the former of which is to be used in occipito-posterior positions, and the latter in the occipito-anterior. If she lie on the left side, the left hand is applicable for the occipito-anterior, and the right for the occipito-posterior positions. But the right side is equally convenient if we use the left hand for the occipito-posterior, and the right one for the occipito-anterior position; it is of little consequence, therefore, which of the three attitudes is taken by the patient.—M.

to follow the advice of De la Tourette, reiterated by Flamant, of introducing the whole hand into the vagina.

When *the arm escapes first*, it not only indicates that the shoulder is at the superior strait, but it also teaches us to which side of the pelvis the vertex and also the face are turned. The thumb corresponds to the summit of the head, while the palm of the hand answers to the abdominal surface. However, it is important to know that, instead of being in a state of supination, or even of slight pronation, the hand and the whole limb may be twisted in a contrary direction, and especially into forced pronation; so that previously to giving a definitive judgment, it is best to slip some of the fingers into the vagina, along the cubital edge of the arm, as far as the armpit, so as to make sure of its relative situation.

If the *back* should stop at the centre of the strait, the range of the vertebral spines and the ribs would suffice to point it out. The absence of ribs in the lumbar region, or on the one hand the hips, and on the other the scapulæ and back part of the neck, might serve to show which way the head is directed.

The sternum, the ribs and clavicles, above which we can also sometimes feel the front of the neck, indicate presentations of the *anterior face of the thorax*.

Where the os uteri is largely dilated, and the membranes ruptured, and the presenting part is not too high up in the pelvis, and has not had time to swell and alter its shape under the influence of the uterine contractions, it is in general pretty easy to distinguish the different positions of the trunk from each other; it is at least always possible to avoid confounding them with those of the head or pelvis; but, in the contrary circumstances, the most consummate experience is sometimes deceived, and it is often impossible to establish a certain diagnosis until after having carried the hand into the womb.

§ 5. CHOICE OF THE HAND.

Where the bag of waters is still unbroken, or the fœtus retains a considerable degree of mobility, it is useless to delay about the choice of the hand to operate with. The one that is most easily used is to be introduced, or the one which habitually brings down the child in the least unfavorable position. Where the position has not been ascertained, or is merely a matter of doubt, the practitioner ought to act in the same manner, or make use of the hand commonly employed in operating for those positions most frequently met with; if, however, there should occur any difficulty after reaching the womb, it is best to withdraw it, and introduce the other hand.

In cases where the presentation is well determined, we may know at once which hand is most favorable to the success of the operation. This is, moreover, liable to vary according to the kind of manœuvre about to be executed, or which it is indispensably necessary to attempt.

For those inclined positions of the head and breech which do not require immediate version by the feet, the left hand ought to be preferred, whenever the deviated parts correspond to some portion of the right half of the pelvis; the right hand, on the contrary, in the opposite deviations, and either of them, indifferently, if the deviation takes place directly front or back. The cephalic version ought to be subjected to the same rule of practice.

For the feet, knees, or breech, those positions in which the posterior surface of the fœtus looks towards the left side of the pelvis are best operated on with the left hand, and the inverse positions with the right hand, although it may be most frequently in our power to do just the contrary if we please.

When the vertex presents first, and we have to bring down the feet, the left hand is most suitable, in left occipito-pelvic positions; that is, the first and fifth of Baudelocque. The right hand, rigorously speaking, is only for the diametrically opposite positions; but, as it terminates a labor in the first position of the

feet, as it is more handy from customary use, and as it manœuvres as well as the other in median positions, it ought to be selected for all the right and antero-posterior positions.

In shoulder presentations, we may lay it down as a general rule, that the left side requires the use of the left hand, and that the right hand should operate in the positions of the right shoulder.

Lastly, we ought to make use of the right hand in presentations of the sternum, or back, whenever the head is not turned to the left, and of the left hand in the opposite case.

These general rules appear to me to be simple, applicable to all cases, and easy to be understood. Baudelocque, Madame Lachapelle, M. Dugès, M. Désormeaux, and very recently, M. Mayor, of Lausanne, also, have advised us to introduce that hand *which, when in a state of semi-pronation, will have the palm turned towards the front of the child, and the fingers towards its lower extremities*; but this rule is too vague, and liable to too many exceptions for it to be used in practice. It is not perfectly exact, either in positions of the pelvis, or those of the back or shoulder; and, in positions of the head and sternum, it is only suitable in the first stage of the operation.

M. de Deutsch, afraid of compressing the cord, of injuring the abdomen and breast, and of fracturing or luxating the limbs by following the anterior plane of the child in order to turn it on its transverse axis, for a long time has followed another plan. After having carried to the fundus of the uterus the part presenting by rolling it along the longitudinal axis of the body, he slides the fingers along the dorsal plane and readily reaches the feet, which he then brings down. I cannot have well understood this way of proceeding, for it does not appear to me to deserve the praise lavished upon it by the author.

Those who have recommended the introduction of the hand that is naturally turned towards the side of the pelvis where the feet are situated, did not observe that it most commonly happens, even in shoulder positions, that the feet remain up towards the fundus of the womb, without being sensibly inclined to one side more than to the other; neither did they remark that precisely the contrary rule is followed where the pelvis presents first.

When M. Gardien says that the right hand is required in all those cases where the feet are to be brought down in the first, and the left where they are to be brought down in the second position, he has approached nearer to the truth, although his assertion is not correct either, except for positions of the head and trunk; but he has rather expressed a fact than endeavored to lay down a rule, which, however, naturally follows from the principles that I have indicated above.

Dr. Breen advises us always to use the left hand, inasmuch, says he, as the right is infinitely more convenient in assisting the action of the other in pressing upon the hypogastrium.

M. Mayor thinks that we can manœuvre with the same hand in all kinds of positions, but always in conformity to the rule indicated above. For this end we have only to vary the posture of the woman, to place her on one side or the other, or on the back or abdomen, according as the abdominal surface of the fœtus, for example, looks to the right, to the left, in front, or to the rear; but I do not see what advantage such a course can have over the one generally pursued in France.

Now, the hand being chosen, in order to let it slip easily through the passages, render its introduction easy, and guard against the infection of contagious diseases, we should cover it with some fatty or mucilaginous substance. It may be immersed in oil or mucilage, or greased with butter or lard. The white of eggs, &c., may be used. Whichever of these substances is selected, it seems to me right always to follow the counsel of Rœderer, that is to say, only to anoint the back

PLATE IX.

VERSION.

FIG. 1.—LEFT OCCIPITO-ILLIAC POSITION.

FIG. 2.—DORSO-PUBIC POSITION OF THE RIGHT SHOULDER.

FIG. 3.—BREECH PRESENTATION.

Fig. 1.

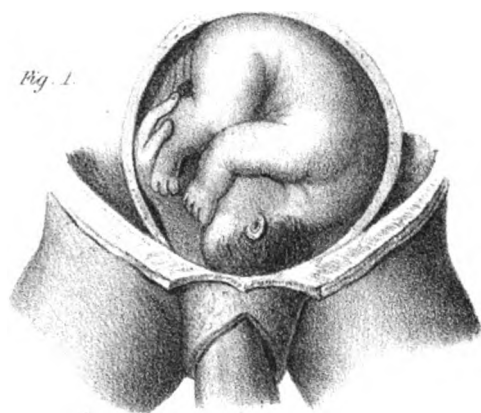


Fig. 2.

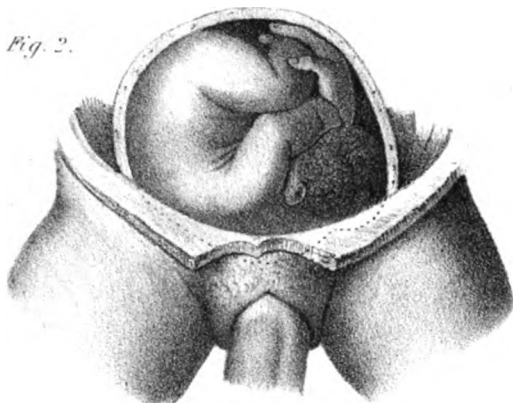


Fig. 3.



of the fingers and hand, which alone exert any friction upon the parts of the mother, while the other surface of the hand has to do only with bodies that are already but too slippery. The forearm ought also to be greased as far as its upper part. If the part of the child we are to pull by were at the vulva, or not high up in the vagina, this precaution might be rather injurious than useful, and the hand should be applied quite dry. It is important, besides, that the nails be short and rounded, so as not to injure the womb. No rings must be on the fingers, not that there is any danger of losing them in the uterus—as Blundell accuses a French accoucheur of having done, I do not know on what ground—but because they may interfere with the operation.

ART. II.—VERSION BY THE HEAD.

§ 1. HISTORY.

Long imbued with the idea that the positions of the head were the only ones which admitted of a fortunate delivery, physicians only thought, in the first place, of restoring that part to the strait, when the child presented otherwise than by the head: the precept of Hippocrates was followed, and they endeavored to bring down the head not only in positions of the shoulder and other regions of the trunk, but also in those of the breech, knees, and even of the feet themselves, which were then looked upon as very dangerous. But the celebrated physician of Cos, admitting that the position of the child might be changed, in changing that of the woman, must very seldom have had recourse to these manipulations. Celsus showed that the fœtus might escape with its lower extremities foremost; but version by the head was not the less regarded as the safest and most practicable process, until the time of Franco and A. Paré. When one foot presents, says Rhodion, it must be pushed up, and the woman, lying with her head down, should turn about and bear down, in order to bring the head down. When the knees present, we bring down the feet. The same must be done when the breech comes down, *although it is best to make the head present*. Since the time of Guillemeau, on the contrary, it has been almost wholly abandoned, and at present the standard authors scarcely mention it, except for the purpose of condemning it.

Notwithstanding what a few modern authors have said about it, no person in France has felt it a duty to put it in practice. Madame Lachapelle even goes so far as to deny its possibility. The objections urged against it are the difficulty of its execution, the smallness of the hold afforded by the head to the hand that attempts to seize it, and the impossibility of bringing it back to the strait, where the womb is ever so slightly contracted upon the child; that even in the most favorable cases, where turning is once effected, the hand cannot assist in the delivery, which must be left to the powers of nature, unless recourse be had to the forceps; whereas, by acting upon the feet, it is an easy matter to extract the fœtus without employing any instrument but the hand that brought them down. Lastly, that, as delivery by the pelvic extremity is almost as natural as by the head, it is evidently preferable to turn and deliver by the feet; and that this is the only method that ought to be attempted where it becomes proper to change the position of the child.

To the above, I answer: 1. That it is not always very difficult to take hold of the head while it is in the womb, and to exert a considerable degree of power on it where that may be required; 2. That, unless the waters have long been discharged, we may often succeed, without much difficulty, in laying hold of the occiput, and bringing it down to the strait, no matter how far it may have been removed therefrom; 3. That in this operation we have not so much to catch hold on the head and compel it to descend, as to push up the part that has engaged in its place; 4. That, far from being a simple and desirable case, a delivery by the pelvis, on the contrary, exposes the child to the greatest danger, while that

by the vertex, even when assisted by the forceps, is evidently less dangerous. If version by the feet has been preferred by the authors of the seventeenth, and by those of the first half of the eighteenth century, it is because they were not yet acquainted with the forceps; and, in fact, found but a very imperfect resource in cephalic version. The discovery of Levret, on the other hand, must have given to this mode of version some of its former reputation; for, when once the head is brought down, nothing prevents its extraction with the forceps, if the case demands it, as is done with the hand in turning by the feet.

M. Flamant seems to have been the first to introduce it in our day, notwithstanding what Osiander says about it, who has attempted to divide the credit of it. In fact, the German professor did not describe it until 1799, whereas it was taught at Strasburg in 1795. Besides, their views upon this subject are but of little value; for version by the head has never ceased to be recommended by some authors. Smellie insists upon having recourse to it when the womb is not too much contracted, and for mal-presentations of the head. If the child presents the side of the neck, says Mauriceau, the head must be brought down, or the shoulders pushed up. De la Motte assures us of having frequently succeeded in this way. Le Roux thinks, also, that we may endeavor to restore the head, or bring it to the orifice, as that is sometimes practicable. A. Leroy himself did not hesitate to recommend strongly cephalic version, in preference to version by the feet, and to defend it in the time of Baudelocque. But Flamant is the only one who has succeeded in calling the attention of observers to it, and in this light his claims are just. Since his time, much attention has been paid to it in the North. M. Labbé quotes two cases of it from him. M. Eckardt cites another case of it. Wigand, also, pointed out other cases of it in 1803. M. Schnaubert published two cases of it in 1815. M. d'Outrepoint announced five cases of it in 1817. Two cases were reported of it in 1825 by M. Regnaud, who, moreover, seems to have been ignorant of the labors of the School of Strasburg. Out of fifteen cases that came under his care in 1826, M. Busch says he had fourteen living children. M. Ritgen had already collected forty-five cases of it in 1827; and M. Jærg has no hesitation in laying it down as a rule that, in version, the head must be brought down whenever it is very near the os uteri, or when it is easier to seize than the feet.

MM. Vallée, de Roche, and Ubersaal, who cite two cases of it, have all expatiated, to a greater or less degree, on version by the head, and endeavored to establish the principles of M. Flamant. Other cases of it have likewise been published. Mr. Merriman, finding he could not reach the feet in a presentation of the arm in 1805, brought down the head to the superior strait, and the child was born alive, the only one out of six of which the woman was mother. He says, also, that he had heard of one or two similar cases; and Mr. Charles Newby communicated to him another. The thirty-second case of Spence was also another case of it. Was not the case where Ramsbotham saw the head engage after he had pushed up the foot, also one of cephalic version? We owe two to M. Notte, and we find sixteen of it in the extract of M. Riecke. M. Stoltz has just published two; and Burns says, like Flamant, that version by the head, before rupture of the membranes, exposes the life of the child less than version by the feet. I will repeat that F. de Hilden and his wife endeavored to bring down the head in preference, even in the presentations of the pelvis; and that they frequently succeeded, *notwithstanding what Franco and Paré say about it*; that Fichet de Fléchy did the same; and that most of the cases of spontaneous evolution of the head that I have cited belong also to that kind of version which Baudelocque himself could not reject altogether. Although he did it once, M. Pacoud does not, however, recommend version by the head; but M. Toussaint, who cites a late case of it, has no hesitation in defending it.

§ 2. APPRECIATION OF CEPHALIC VERSION.

Cephalic version may, therefore, be attempted, 1. In a well-formed pelvis, where no other accident has happened than the mal-presentation of the fœtus, and the head is found in an inclined position in the vicinity of the strait; 2. In presentations of the shoulder, back, or anterior part of the thorax, provided the arm is not prolapsed, and the uterus not too much contracted. Lastly, it seems prudent to try it whenever the feet are farther removed from the strait than the head is, and where it is probable that the labor would terminate spontaneously if the head were at the strait. Moreover, after having attempted to perform it in vain, we are not prevented from still proceeding in search of the feet, which can be as readily found after as before the attempt has been made. If the head seems disposed to come down, we may endeavor to bring it down; if not, we have only to direct the hand towards the feet. I do not think, however, with Guillemot, that this kind of turning ought to be preferred in the inclined positions of the pelvis, nor, *à fortiori*, where the breech presents fairly. MM. Flamant and Schweighæuser wish it to be preferred in all cases, even where there are accidents on the part of the mother, because, when the head is once brought to the strait, it can be laid hold of with the forceps. Perhaps they might be imitated with advantage in some cases where the fœtus is very movable in the uterus; but I doubt if it be possible where the waters have passed off, and the womb is strongly contracted on the child.

Restricted to the preceding indications, cephalic version is really an important operation. The arguments advanced recently at the Academy of Medicine, with the view of rejecting it absolutely, prove nothing against it. It is not merely because the resistance of the cervix repels and drives the fluids towards the head, as the authors seem to think, but rather from the compression of the cord, of the abdomen and breast, from the possibility of the head being thrown backwards, the tractions that are sometimes necessary to be made on the spine, and all the inconveniences pointed out in the article on Delivery by the Pelvis, that the escape or extraction of the child by the feet is attended with more danger than by the head. It is true the similarity between natural presentation of the head and cephalic version is not perfect. In the former case, until the termination, a portion of amniotic fluid surrounds the fœtus so as to protect it against the efforts of the uterus, whereas, the operations of the hand in the latter cause it to flow out entirely. The less water remains in the womb after the dilatation of the neck, the sooner the child escapes. When the child is restored to the superior strait, one of two things takes place: 1st, the uterus ceases to contract, and a few hours' calm is observed; at this time the child is scarcely compressed, and runs no risk in this respect. 2d, the labor continues to advance, very frequently even increases in activity, and in this case the head, provided it is properly placed, very soon passes through the pelvic canal. If any accident, or a certain degree of contraction of the pelvis, should cause the least alarm, it can at once be removed by the application of the forceps.

Although, out of a certain number of cases at the *Maternité* at Paris, version by the feet has given but two dead children in twenty-one, it has unfortunately been shown by daily practice, and in numerous public institutions, that this operation is infinitely more dangerous. Out of 3120, M. Riecke says, 300 women and 1675 fœtuses were lost. Stein reports thirty-three dead children in sixty-six; Boer two in five; Osiander forty-one in sixty-eight; and M. Carus very nearly one-half. I had fifteen out of eighty. Cephalic version undoubtedly has the advantage, for M. Busch mentions but one death in fifteen, and M. Riecke one in sixteen. To what conclusions shall we come after these two simple statements?

§ 3. MANIPULATION IN CEPHALIC VERSION.

Version by the head, says M. Busch, is effected in two ways: 1st, by pushing

back the part that engages, or is disposed to engage, in order that, by its contraction, the uterus may cause the head to descend; 2d, by seizing the head itself, with the view of bringing it into the strait.

Thus, the woman being placed as has been directed, the left hand is introduced if the head is to the right, and the right hand, on the contrary, if to the left; and either one or the other almost indifferently, if the vertex is turned in front or directly behind.

In the first place, the part that is engaged is to be pushed upwards; we should try to remove it from the strait, and direct it towards the iliac fossa that is opposite to the one occupied by the vertex; in this way, the womb is enabled to exert its power on the head, and return it to the centre of the pelvis. After having thus raised up the shoulder, if the head does not descend, seek for it with the hand, and take hold of it with all the fingers, which draw it down as with a crotchet, and at the same time endeavor to make it assume, in preference, one of the occipito-anterior positions. The ancients understood perfectly well this mechanism, for Albucasis invented an instrument for raising the body while he was drawing on the head with the other hand. When the head has been brought to the centre of the pelvic circle, it is left there, and the delivery requires no further assistance, provided there be no other accident in the case; if the contrary should happen, the forceps should be immediately substituted for the hand.

External Manipulations.—Wigand, in speaking of cephalic version, says that we may often succeed in operating without introducing the hand into the genital organs; he thinks that, by acting upon the womb through the abdominal parietes, and assisting it by the posture of the woman, we may most commonly bring back the head to the superior strait. Before I was acquainted with the doctrine of the German professor, I had already followed this precept, and have, in conforming to it, found that it is, in fact, sometimes possible to restore the vertex to its natural position. I have done it twice since with success, before the rupture of the membranes. But I do not think that this manœuvre can ever be of much use where the waters have been long discharged, and the womb strongly contracted on the child. We succeed then, as in the days of Hippocrates, by changing the position of the woman, and by shaking her. Rhodion, who recommends the returning of the child by pushing up the side of the belly, or placing the woman on the other side, was evidently impressed with the same idea. It must have been the same in the practice recommended by Sennertus, who insists on pressing on the womb, rolling it about, taking the woman by the feet and shaking her, and in the shampooing used in Russia by the common people. Mr. Buchanan also succeeded in the same way in changing a presentation of the arm by making the woman get on her knees before the escape of the waters. Without relying too much on its value, it is then a resource not to be neglected in certain cases, particularly since M. Riecke attributes to it several late cases of success.

ART. III.—VERSION BY THE FEET.

The ancients resorted to version by the feet, though not frequently, and it would be unjust not to refer the idea or application of it to the time of Paré or Franco. Aetius says that if the head is too large we must push it up and seize the feet. In presentations of the back, Moschion brought down the head or the feet, when they were nearest the orifice. If we are unable to restore the head in preternatural presentations, Avicenna insists on seeking the feet. Rueff, like Rhodion, directs also the midwife to seize the part nearest the strait, and draw on it when she is unable to get the head. J. Bauhin holds the same language. With them it was a last resource, whereas now the principle has been reversed, and the head is very seldom brought down.

§ 1. MANIPULATION IN PELVIC VERSION.

The manœuvre in turning by the feet consists of three principal stages. It is necessary, 1. To introduce the hand; 2. To change the presentation of the child; 3. To assist in the extraction of the ovum.

These three stages are never found together in turning by the head, where, as has been already seen, the action of the hand is of no further use after the head has been properly placed at the superior strait; in some of the feet positions, the *manœuvre* is almost wholly confined to the stage of extraction. But then it is in fact nothing but simple extraction, and not a version.

A. *Introduction of the hand.*—Many authors advise us to penetrate into the vagina at the very moment of a strong uterine contraction; in this way, say they, the pain produced by the operation becomes confounded with the pain of the contraction, and the woman does not distinguish them apart; then also the vagina is both enlarged and shortened by the temporary descent of the womb, which, as it were, comes down to meet the hand. In theory, these assertions may be very correct; but in practice they certainly do not authorize the precept which it has been attempted to draw from it; and, like M. Désormeaux, I think, from my own experience, that the hand should generally be passed through the vulva in the intervals between the pains.

Whatever mode be adopted on this point, the fingers, being placed side by side, must first be introduced in the direction of the length of the vulva; after which, they are brought together in such a way that their palmar surface forms a kind of gutter, in which the thumb is lodged, so that the whole may form a very long cone, the base of which is found at the place of the metacarpo-phalangeal articulations. The hand thus gets into the vaginal cavity, following the direction of the axis of the inferior strait.

In order to penetrate through the os uteri, it is absolutely necessary to choose a time when the pain is off, so much so that nobody has ever dared to prescribe the contrary. Otherwise, indeed, it would often be impossible to get into the uterus; there would be a risk of lacerating the orifice; and in fine, we would voluntarily create a thousand difficulties, and expose the woman to numerous dangers.

If the dilatation is very much advanced, the fingers, which are at first held together, should be almost immediately more or less separated, so as to accommodate them to the form of the part that presents, and allow them to slip easily between it and the parietes of the womb. In the contrary case, they are to be introduced one after the other, and the cone formed by their junction is soon reproduced. They are then gently passed onwards, taking care to stop upon the recurrence of each pain, and always move in the axis of the superior strait. Here it is above all important not to be in a hurry; for the movements and the efforts require the greatest gentleness. Instead of pressing forwards to dilate the os uteri, it is sometimes better to separate the base of the fingers moderately and by degrees, or at least the portion of the cone already introduced into the orifice. During this manœuvre, the other hand should be applied to the patient's hypogastrium, for the purpose of supporting the uterus, and inclining it backwards or to one side, if necessary. As soon as the roots of the fingers have passed through the os uteri, the whole hand enters without difficulty into the uterine cavity, and thenceforth the intromission is effected.

If the bag of waters are not broken, Peu recommends slipping the hand between the womb and the ovum, so as to seize the feet without rupturing the membranes. This plan, which Deleurye, Madame Lachapelle, and Dewees have again proposed, and which Morlanne has especially recommended, appeared dangerous to Levret, who apprehended detachment of the placenta. I do not think that in this respect there is any real danger. The advice of Peu is certainly good, inasmuch as it takes away from the womb the possibility of its diminishing before the accoucheur

has satisfactorily seized the feet; but, as version ordinarily offers less embarrassment when it is attempted before the escape of the amniotic fluid, it is a practice that may be adopted or rejected almost indifferently.

Period of exploration.—Before proceeding any farther, the state of the case must be ascertained; we must be sure not to be deceived as to the position of the foetus; not to confound the arms with the legs; to see if any part is twisted out of its proper position; and endeavor to learn where are the feet or breech after having first recognized the head; then to get hold of the child for the purpose of extracting it, or changing its position. It is essential to remark that several points of its body cannot bear the degree of pressure which it is sometimes found necessary to exert. For example, we ought to avoid pressing the ends of the fingers upon the sutures, the fontanelles, the abdomen, and sides of the thorax. For the purpose of pushing up, turning, or extracting the foetus, we ought to apply the hand only to the forehead, the occiput, the temples, the parietal bones, the shoulders, the spine, the sternum, the hips, and the limbs.

B. Mutation.—After having ascertained the part that presents, it is pushed up to free the superior strait, taking care to apply the fingers to a surface as extensive as possible; then the feet should be sought for, seized, and brought to the orifice. The foetus must never be brought down otherwise than in conformity to its natural flexures; that is to say, it must be rolled up on its anterior surface. By turning it over backwards, as Justine of Brandenburg was in the habit of doing, and as Deleurye still recommends, or on the side, it would necessarily be brought in the direction of its extension; it would soon become an inflexible trunk, or arc of a circle, which most generally would render the remainder of the operation impossible; the uterine cavity would not be sufficiently spacious to admit of the evolution, and the least force would hazard the luxation or fracture of the limbs, the rupture of the spinal marrow, and would give rise to extremely severe pains on the part of the woman, and perhaps even to laceration of the uterus, and would not fail above all to destroy the life of the child.

If it seems difficult to reach both feet, we may satisfy ourselves with one. Portal even says that when one of them is found, it is useless to look for the other. Puzos likewise insists on drawing on a single foot when we cannot find the other, and maintains that this practice, for which we are indebted to Clement, is sound. Giffard seems to have delivered forty-seven women by following this course. Deleurye, in like manner, insists on drawing on the first without troubling ourselves about the one which is retained. M. Kilian is also averse to looking for the second foot when one alone presents; for, in his opinion, this presentation is decidedly the best. He incorrectly states, as we perceive, that Yorg, the first after Portal and De la Motte, did not hesitate to assert that version is more readily effected by bringing one foot down, than in insisting on waiting for both. Wigand, Carus, and Siebold, in Germany, profess the same opinion. As regards myself, it is my impression that, without troubling ourselves too much about the second, we should, notwithstanding, endeavor to reach it. A fillet passed over the limb that is down, says Paré, assists us in looking for the other.

Hunter himself maintained in his lectures that the breech should be brought down in place of the feet or the knees; but this precept, which would offer in fact the advantage of engaging the whole pelvis in the neck, would not suffer the version to be carried sufficiently far to attain the end in view.

Version by the breech, passed over in silence by almost all accoucheurs, says Kilian, would appear to have been practiced by Peu. Schweighæuser, Schmitt, and Besethler, have given it all the credit it deserves; for it is acknowledged, according to this author, that the presentation of the breech is more advantageous than that of the feet. He insists on practicing it when the feet cannot be found, when the womb contracts powerfully on the foetus and the hand of the operator, or

when there is some hope of this organ possessing still sufficient energy finally to terminate the labor.

Mr. Radfort, remarking that, after delivery by the head, delivery by the breech offers the least danger, and observing, on the other hand, that version by the breech is more difficult than version by the feet, in his turn proposes, as a general rule, never to bring down but one foot, or one knee, to the orifice, when our object is to extract the child by the pelvis. This method should be tried.

Whilst engaged in exploring, and turning the child, it is not less essential to support the womb outwardly than it is during the time of intromission. The hand that is held applied to the hypogastrium may aid also, by suitable pressure, in causing the head, the shoulder, or the limbs to descend, which renders the turning in all respects easier and surer; but for this precaution, the accoucheur would be liable, when compelled to exert a certain degree of force, and particularly where the liquor amnii has been long discharged, to produce dangerous stretchings, to separate the vagina from the cervix, to rupture the womb itself at some weak part, or at those points where the womb is most strongly contracted on the projecting and solid part of the fœtus.

These manœuvres ought always to be executed in the intervals between the pains; they would be excessively dangerous if performed during the contractions, and would generally occasion fatal lacerations; besides, it is often impossible at those times to move the fœtus; the hand soon becomes so compressed that it is quickly benumbed, and completely loses all its powers of sensation and motion. As soon, therefore, as a pain appears, all exertion is to be suspended; it should not be begun again until the contraction has ceased, unless, however, some serious circumstances necessitate a very prompt termination of the labor.

I ought, also, to warn the young practitioner that, in order to reach the fundus of the womb, the arm must be introduced much farther than he would at first suppose, and that to get into the axis of the superior strait, the hand should be much more inclined forwards than would be imagined upon the inspection of a dried pelvis.

Most accoucheurs have recommended, and still advise, that the feet should be seized, and not any other part of the limbs; in fine, the feet are the only parts by which we are advised to pull, in the kind of turning under consideration. Nevertheless, it is possible, it is in many cases even advantageous, to follow the counsel given at first by Burton, reproduced by Delpech, and very recently again by Dr. Breen—that is, to take hold of the knees* or hams, rather than the feet.

C. *Extraction.*—When the mutation has been completed, and the child reduced to one of the positions of the extremities of its great diameter, we may stop, provided the pelvis be well formed and the womb retains sufficient energy to terminate the rest of the labor. This is the way we are compelled to act in all cases of version by the head, unless we choose to apply the forceps; but when the feet are brought down, ought they also to be abandoned after they are placed in a situation which no longer prevents the spontaneous delivery of the child? To authorize this advice, it has been supposed: 1. That pulling on the child ought always to be avoided when not absolutely necessary; 2. That tractions force the arms to rise alongside of the head, which prevents its advance, and that they almost always place the occipito-frontal or occipito-mental diameters in the situation that ought to be occupied by the occipito-bregmatic; 3. That, in rapidly passing through the

* It is quite as well to turn by the hams as by the feet; I, at least, have found it so. It should be remarked that, where any considerable difficulty is experienced in the exploration for both feet, it is perfectly safe to draw down only one; the turning is easily effected, and the fœtus is actually safer, because if only one foot is employed for the *mutation* and *extraction*, the other one is folded up on the child's body, which makes of the case a sort of breech presentation. The head is extracted more easily the greater the dilatation of the parts effected before the head comes to the opening. I speak from experience.—M.

os uteri, the belly and breast of the fœtus are subjected to too sudden a compression; 4. Lastly, that the womb, being too suddenly emptied, may become inverted, fall into inertia, and give rise to hemorrhage, &c.

All these inconveniences are real, and nothing would be so easy as to enlarge the list: but, on the other hand, it should not be overlooked that the woman submits to the operation only for the hope of being soon delivered; that her family and attendants cannot be satisfied until the child is completely expelled; that, in case of abundant hemorrhage, of syncope, of lipothymia, convulsions, premature descent of the cord and exhaustion, we have no right to wait; that inertia ought rarely to occur in such circumstances, seeing that the manœuvre is better calculated to remedy than produce it; that the compression of the abdomen, when the hand has been previously introduced into the womb, ought not to inspire any great alarm; that, at least, it is scarcely more to be feared where we draw the fœtus down by the hand, than where it is simply pushed down by the efforts of the mother; lastly, that it is possible to avoid one extreme without falling into another, and that it is as dangerous, in the practice of midwifery, not to act *à propos*, as to act without any necessity.

A well-informed and prudent man will, therefore, preserve a just medium, and proportion his manœuvre to the circumstances of each particular case. If not pressed by any important circumstance, as Burton recommends, and as Rivière d'Uzerches and Destremeau did, he will wait, and excite the uterine actions so as to draw the child downwards concurrently with them, for the two actions ought to be so combined as to constitute, as it were, but one. At each pain the womb ought to commence before the hand, and finish after it. By pursuing this course, we imitate a spontaneous delivery; the arms sometimes descend before the head, which continues bent down upon the breast, and the occipito-bregmatic diameter does not lose its natural relation to the strait of the pelvis; it is in no case indispensably necessary to pull hard enough to rupture the spinal marrow or detruncate the fœtus.

If, on the contrary, there should be no other chance of safety, either for the mother or the child, than in a prompt delivery, and should the contractions of the womb be too slow and feeble to admit of his relying upon them, the tractions performed by the accoucheur ought not only to assist, but they should more or less become the substitutes of the powers of the woman: there can be no hesitation in such a case; of two unavoidable evils we must choose the less. I need not repeat that, in the former as well as in the latter case, the tractions ought to be performed with great caution; never by jerks, and always in the axis of the straits.

To conclude, extraction may be considered under two principal points of view: 1. As a mere accessory power added to that of the womb, and which hastens the termination of a painful function; 2. As a principal, or even sole resource, in cases where the organism is powerless, or where it is of importance to empty the uterus within a few minutes. This distinction being once established, I do not see how any discussion can afterwards arise as to whether the child may or may not be pulled downwards after it has been turned. As long as the tractions are confined to the part first assigned to them, it is evident they can be only of service, and no well-informed man will ever make use of them in the other way, without a clearly understood necessity for so doing. It is then useless to examine whether it is really worth while to rely on the organism as soon as the breech is down, as Smellie and Deleurye say, according to Leroux; or only when the breast is engaged, as Leroux himself recommends.

ART. IV.—VERSION BY THE FEET IN CEPHALIC PRESENTATIONS.

Relatively to turning by the feet, the positions of the head ought to be reduced to two: the left occipito-iliac, to which we bring the first and fifth of Baude-locque—and the right occipito-iliac, which comprises the second and fourth of the same author; to which, also, we ought to bring the occipito and fronto-pubic positions, should they be met with. The doctrine of M. Nægèle is, consequently, perfectly inapplicable here.

The first of these requires the left hand, and the right hand is preferable for the second.

§ 1. LEFT OCCIPITO-ILIAC POSITIONS.

The *left hand* enters the vagina in a state of pronation, passes along the anterior face of the sacrum, penetrates into the orifice, and, if the occiput is turned directly to the left, remains in a state of semi-pronation, approaches a state of supination if the vertex is in the first position, but must be held quite prone if the vertex is turned backwards and to the left, &c. The head is to be taken hold of and held in the hand, and not merely with the points of the fingers. The thumb is placed on the right temple, or parietal protuberance, and the other fingers, being more or less separated, are applied to the face and to the opposite temple.

At first, this part is thrust upwards and along the axis of the superior strait, that is to say, upwards and forwards; it is afterwards pushed towards the left iliac fossa, taking care to favor this movement with the right hand, which, being placed upon the hypogastrium, sustains the fundus of the womb, and inclines it more or less backwards and to the right.

Now is the time to go in search of the feet. For this end the hand may pass along the anterior surface of the child, and arrive directly at the knees, or at the roots of the thighs. This is the shortest route; but, by following it we are liable to several errors; in short, to mistake the elbow for the knee, the foot for the hand, the arms for the legs; and the safest way is to act in the following manner: We begin by extending all the fingers, and the thumb also, towards the left side of the head; they ought to be placed side by side, and extended in order to occupy the least possible space; they are then passed over the whole of the left lateral surface of the child, by sliding along behind the neck, the shoulder, the breast, the flank, and the hip. During all this time, the anterior part of the wrist supports the forehead, and prevents it from descending again into the strait; the other hand pushes the womb backwards as much as is necessary or possible, and endeavors to bring the parts we are trying to get hold of as near as possible to the fingers.

If the legs are in their natural state of flexion, we endeavor to carry the whole hand, flattened, above and behind the breast, turning it more and more into a state of pronation as we proceed; if they are, on the contrary, turned out of the way or displaced from their natural positions, if it appears too difficult to envelop their posterior surface in the palm of the hand, we should take hold of both of them if possible, or at least that one which is nearest the posterior surface of the womb, embracing their root with the thumb which is fixed in the groin, and with the fingers which are kept upon the posterior surface of the thighs. Should they be twisted or crossed; should one of them be found flexed, and the other extended; finally, if we have attempted in vain to get hold of them both together, and should be obliged to bring them down one after the other, we should at all events carefully try to bring down the posterior limb first, even although it should be the most distant one from the orifice.

In the first case, to continue the operation the hand has only to slip along behind the thighs and legs, which it pushes before it, extending them as they

come down; in this way, the feet can neither escape nor deviate, and may be conducted without difficulty to the superior strait.

In the second case, more difficulty is generally met with. We are sometimes obliged to act successively on the thigh and leg, as if they were levers of the first kind. While we are searching for one foot, the other escapes, and it is always a difficult matter to draw them both down together, unless we have been so fortunate as to get hold of the hams with the fingers and thumb at the commencement of the search.

In the third case, that is to say, when the limbs are far removed from their natural attitude, and always when we are obliged to bring them down one after the other, we act as we best can; only we should, while pulling at the leg first got hold of, endeavor to make it approach the opposite limb. By adducting it, which is naturally a very limited motion, and which would expose the child to the risk of luxations or fractures, we should also have the disadvantage of fatiguing the uterus far more than by following an abductive movement for its free exercise; also, the last-named movement requires much less space than the other.

However it may be, when one of the feet has reached the vagina or the vulva, it should be secured by means of a fillet previously to going in search of the other; not with a view of hindering it from mounting upwards again, as some of the ancient authors imagined, but only that it may be found again when wanted. This precaution being taken, the left hand is again carried into the womb; and that it may more readily reach the other foot, it should follow along the inner and posterior surface of the one held in the fillet. By conforming to this rule, we necessarily meet with the crease of the breech and sexual organs; the thigh we are in search of cannot now be mistaken; and we thus avoid a good deal of tiresome manipulation. It ought to be well understood that this foot is to be brought down in adduction by following the anterior surface of the fœtus, and the side of the other leg.

After having succeeded, in any way, in extending the legs, and bringing them down into the excavation, we place the index between them above the inner ankles, while the thumb and the other fingers are applied to their outer surfaces, and in such a way that the heels lodge in the palm of the hand. If the head, forced down by the womb, or ill supported by the wrist, should have approached too near the orifice, we should, before we pull the feet down, and without letting them go, push it up again towards the left iliac fossa with the ball of the thumb.

The first object of the tractions now to be performed is to turn the child, to compel the head to rise up towards the fundus of the womb, whilst the pelvis is drawn into the superior strait, and to convert one of the left positions of the vertex into one of the right positions of the feet; that this mutation may yield all the advantages we are authorized to expect from it, the back of the child must always turn to the right, then a little in front, but never backwards. Consequently, the operator will carefully avoid inclining the hand in supination, after he has begun to pull on the legs; he should keep it in semi-pronation, to reduce to the second position of Baudelocque; and even if that should not suffice, he ought to try to get the right foot, which is in front, with the right hand, and draw down solely, or almost solely, by it, until the tendency of the back to direct itself backwards shall have been overcome.

As soon as both of the feet have passed through the vulva, they should be wrapped in a dry cloth, so that they may be held more firmly. The hips soon pass through the orifice, and present at the inferior strait. As the limbs come forth, the hands, which are applied, the right one in front and the left one behind, ought to extend along them towards the vulva, so as to hold them by as large a surface as possible; the thumbs are therefore placed behind; the two last

fingers on the anterior surface, and the index and medius extended on the outside of each leg or each thigh, until the hips shall have been born.

Before proceeding any further, it is proper to attend to the umbilical cord, to see that it be not stretched, by carrying the index and the thumb, or two other fingers of the right hand, towards its insertion on the belly of the child. If it should be found tense, a loop of it of sufficient length should be brought down by pulling the placental portion, but never by pulling its abdominal portion. If it is found not to be stretched at all about the navel, it may be let alone. If it should proceed from the navel down betwixt the thighs, and then mount up along the child's back, so that the circulation should appear to suffer, it ought to be disengaged, and even divided, should the danger appear to be pressing, and no other means of disengaging the limbs be discoverable; but after that, the labor ought to be terminated within a very few minutes. I do not think it important to tie it twice before cutting it, as M. Kilian recommends, who fears, from the neglect of this precaution, that the child may perish from hemorrhage, of which Denman cites a case.

We continue the tractions obliquely downwards and backwards, that is to say, in the axis of the superior strait. As the hips are disengaged, they are in turn taken hold of, the left or posterior one with the left hand, and *vice versa*, but in such a way that the fingers are not applied higher up than the cristæ of the ilia, so as to avoid pressing upon the abdominal viscera. The belly and the breast soon follow; this is the time that the arms rise upwards, that the shoulders engage, and that it is essentially important to combine the efforts of the accoucheur with those of the woman, in order to avoid a departure of the chin from the breast. Whatever resistance may be met with in engaging the shoulders in the excavation, we ought never to imitate those routine practitioners, who, while they are pulling the child downwards, can never think of anything better than to make it revolve on its axis, or make its whole body perform a more or less extensive movement of circumduction; neither should we move it alternately from the internal surface of one thigh to that of the other, nor raise and depress it by turns from sacrum to pubis, and *vice versa*. Such manœuvres cannot do any good, and may stretch the dorsal or cervical portions of the spine too much. When it is found insufficient to draw downwards in the direction of the straits, it may be barely proper to try the effect of diagonal tractions, that is to say, we may pull downwards towards that oblique diameter, which at the superior strait corresponds to the greatest diameter of the shoulders. In the first place, while continuing to pull gently, we raise up the child's pelvis, as if we intended to carry it towards the mother's left groin; it is then depressed towards the right sacro-sciatic notch; afterwards we continue to raise and depress it, until the shoulders, which in this way engage one after the other, and receive the greatest part of the force employed, are near enough to the inferior strait to be easily got hold of. When the child has advanced thus far, we must attend to the extraction of the arms.

When the child is small or the pelvis very large, the presence of the arms offers but a small obstacle to the escape of the head, and we ought, properly, to abstain from disengaging them; but in all other cases, they cannot fail to embarrass the rest of the operation, and prudence, if not an indispensable necessity, requires that they shall be brought down. Some authors have said, and Deventer still says, that, when applied alongside of the neck, they facilitate the passage of the head, the dilatation of the vulva, that they obviate the contraction of the uterine circle, and the strangulation of the fœtus, and that they are never so large as to prevent the delivery from taking place; but as this opinion is not founded on any plausible reason, and is strongly denied by Peü, it does not deserve the trouble of being opposed, and at present no one follows the practice, although

A. Petit and Millot have since given the same advice, endorsed also by M. Fricrip, who insists on not bringing down the arms, because they prevent, says he, the compression of the cord and of the neck.

The member nearest the sacrum must always be extracted first. Should we begin with the other, we would meet with great difficulty, and when we have succeeded, the other arm would not be found to be at all more free.

The trunk, which should always be wrapped up in a cloth, is supported by the right hand, as it is performing the oblique tractions. The left thumb, in a state of pronation, is placed in the hollow of the corresponding axilla, while the index and medius are applied to the outer and anterior surfaces of the arm, as far as the bend of the elbow, as if to form a tackle for the humerus. We then act upon the whole arm as upon a lever of the third kind; the thumb represents the fulcrum, the fingers the power, and the resistance is found in the forearm of the child. While we are thus acting on the arm to bring it down, it must be carried in the direction of adduction, so that as it sinks down it may slide over the fore part of the breast. If we should be content with hooking it with one or two fingers, we would run a risk of fracturing the bone, or at least of exerting the force only upon the shoulder-joint.

When the whole shoulder is much elevated, it is sometimes found advantageous to follow the advice of Baudelocque, which has been repeated by almost all the accoucheurs of our own day, namely, to divide this little operation into two stages—to put the hand at first in pronation, so that the thumb may for an instant take the place of the other fingers, and operate in succession upon the whole limb, beginning at the root of it; but this precaution is most frequently unnecessary, and I have had no occasion to repent of having generally neglected it.

The arm having been brought down, it is to be extended along the side of the thorax; the right hand deposits the trunk of the child in the left hand, and then proceeds to disengage the anterior or sub-pubal member, according to the method indicated above.

Instead of following their natural tendency to rise up alongside of the head, the arms are sometimes turned backwards, and that in two different ways: 1. One of them or both, but generally only one, and especially the one that ought to be found in front, is fixed behind the neck, so as to arrest the progress of the occiput; 2. Previously to rising upwards, or even while in the act of rising, they get behind, and cross each other upon the back, below the shoulders, which may occasion their being luxated, or even fractured, and greatly increase the difficulties of the manœuvre, provided it be not remedied in good time.

In the first case, we commence by disengaging the arm that is not deviated; we then push the trunk up a little, so as to compel the head to rise, and as far as possible to diminish the pressure upon the other arm; after which the fingers and the thumb ought to be applied as has been already directed, and act upon the same principles, but with rather more gentleness. If the arm resists, we attempt to make it rise up above the occiput, and the blunt hook proposed by M. Dubois ought not to be employed until all other attempts shall have proved to be insufficient.

In the second, even although the forearm should have passed quite across to the opposite side, as seems to have happened in a case under the care of M. Dugès, and even though it should have risen as high as the nucha, it ought always to be hooked with the middle and forefinger to draw it down along the child's back, and bring it out of the vulva; it is generally pretty easy to succeed in this manœuvre, but the breast has sometimes to be pushed strongly up, or the trunk more or less considerably rotated, before it can be effected. When the arms are crossed on the neck, M. Kilian makes the child perform a rotatory movement in the direction of its longitudinal axis, and endeavors to direct the

arm he wishes to disengage first into the excavation of the sacrum, having attained which, the rest of the operation is rendered very easy.

Should the exertions of the accoucheur have been well seconded by the contractions of the womb, the head ought now to have descended into the excavation, or at least be considerably engaged within the superior strait, so that the occipito-bregmatic and bi-parietal diameters would be found to be in proper relation to the oblique diameters of the pelvic circle.

In that case, the right hand, passing along the front of the breast and throat, penetrates in a flattened and half supine position quite into the vagina; the thumb and two last fingers are placed on the sides of the throat, the index and medius should be directed on to the chin, or in the mouth, or, what is still better, on each side of the nose, for the purpose of keeping its head in the natural state of flexion, and approximate the facial extremity of the occipito-mental diameter as much as possible to the sternum; after having placed the right hand properly, the fœtus is to be laid on its belly upon the anterior surface of the corresponding arm, which is then much depressed towards the perineum, without, however, pulling, for the object at that moment is merely to disengage the vertex from the pubic arch. In the next place, two or three of the first fingers of the left hand are to be carried under the occiput, to sustain it, and prevent it from engaging before the chin; the thumb, the other fingers, and the rest of this hand are applied naturally behind the neck, and we attempt to push the head upwards in the axis of the superior strait, so as to cause it more easily to perform its pivot-motion.

When we have succeeded in getting the face into the hollow of the sacrum, and the occiput behind the symphysis, or merely to one side, as Deleurye recommends, who brings forward several cases in support of his method, or as Millot does, who advocates the views of Burton, Rœderer, A. Petit, and Lemoine, we should wait for a pain. The woman should be told to bear down, and the two hands being fixed as has been stated, we immediately begin to exert some tractive force on the head, which is gradually drawn down in the axis of the straits, while at the same time the trunk of the child is gradually raised upwards, as if we were going to turn it over on to the hypogastrium of the mother.

When the efforts of the accoucheur have not been sufficiently seconded by the contractions of the womb, or when, after the delivery of the shoulders, the head has not performed its flexion movement, and is found to be arrested at the superior strait, it is sometimes very difficult to reach it, and still more so to get it down; however, until we can reach it, all tractive force on the trunk is to be suspended, for it would only tend to reverse it still more. The hands, placed as before, should be carried further up. At this juncture it is particularly useful to apply the fore and middle fingers to each side of the nose; for by applying them to the inside of the mouth, there would be a risk of depressing the lower jaw only, or of luxating it or straining it to an injurious degree. But in this case also it is most difficult to reach this part of the face; and further, it must be confessed that, when we have reached it, if a good deal of force is required, the fingers slip and get off from it with surprising facility; so that we are mostly under the necessity of fixing them on the most movable part of the face, a part the least calculated to bear the force necessary to make the head turn forwards.

It is therefore indispensably necessary to stimulate the action of the womb or that of the abdominal muscles. As the efforts of the woman oblige the anterior or mental branch of the sort of lever represented by the head to descend first, the least pulling at the jaw in a direction from above downwards is then very efficacious. Those tractions, on the contrary, which the accoucheur exerts on the trunk of the body, being more particularly transferred to the occiput, tend naturally to produce the inverse effect of the one we wish to obtain. It is therefore essential not to pull, except upon the face, whether there be any pains

or not, until we have brought the occipito-bregmatic diameter of the head to correspond with one of the diameters of the pelvis.

To the inconvenience of a reversion of the head there is sometimes added another that never fails to be embarrassing; instead of looking backwards and to the left, or directly to the left, the face is sometimes found to turn more or less in front, or directly backwards, so that the neck is twisted round on its own axis. In this state of things, all tractions on the trunk of the body would be dangerous. Previously to doing anything of that sort, we ought, in the absence of a pain, to push up the breast, and take hold of the chin with two fingers of the right hand, disengage it and direct it towards the sacro-iliac symphysis, while with the left hand on the hypogastrium we favor, first the rotation, and then the flexion of the entire head; afterwards we proceed as in the former case. Perhaps, also, it would be well then to turn the head from above downwards, so as to make it come down first, as Leroux and M. Eckardt each report a case of the kind. The forceps, which Plenck, Wrisberg, and Hamilton recommend always when the head is arrested at the superior strait, might also be applied with this view, which M. Michaelis advises.

At the latter period of this operation, we should, above all things, think of the respiration of the child. If the extraction of the head does not seem to take place rapidly, it would be advisable to depress the tongue at the same time as the chin, with one or two fingers, and to favor in this way the entrance of the air into the lungs. Morlanne very properly insists on this advice.

§ 2. RIGHT OCCIPITO-ILLAC POSITION.

In the third and sixth positions of Baudelocque, we might, strictly speaking, use the left hand with the same facility as the right; but the latter is preferred, because it terminates the delivery in the first position of the feet, which appears to be rather more advantageous than the second, and because we can generally manœuvre with it better than with the other hand.

Whether, therefore, the occiput be towards the pubis, the sacrum, the right acetabulum, or the right sacro-iliac symphysis, the right hand ought always to be made use of, in a supine position in the first case, prone in the second, half supine in the third, and in a state of semi-pronation in the fourth. By placing the thumb on the left temple, and the fingers on the opposite temple and side of the face, we can embrace the head in the hand, raise it up in the axis of the superior strait, push it towards the right iliac fossa, and then reach the ear of the same side, so that the hand may be supine, and the thumb brought close to the radial side of the index finger; the hand, being then flattened out, may slip all along the child's right side, and as it becomes prone, get hold of the feet, and act in all respects as the left hand does in a left occipito-iliac position.

ART. V.—VERSION BY THE FEET IN PRESENTATION OF THE FACE.

When the *face presents first*, the manœuvre does not sensibly differ from that which is used for the positions of the vertex. The right hand is always to be introduced where the chin is to the left, in front, or to the rear; or, to speak more generally, and perhaps also more correctly, the right hand is to be employed in all cases where it seems easier to push the forehead towards the right iliac fossa than towards the opposite one—and the left hand in all other cases. As positions of the face are nothing more than reversed positions of the vertex, they should not require a different manœuvre, only in seizing the head the palm of the hand is placed on the chin and face instead of the forehead. It is the fore part of the neck, rather than the cranium, that requires to be raised and corrected before seeking the feet; and in fine, the eyes, the nose, and the mouth, in place of the sutures and fontanelles, require management.

ART. VI.—VERSION BY THE FEET IN DEVIATED PRESENTATIONS OF THE HEAD.

The other inclined presentations, that is to say, those of the temples and posterior part of the occiput, when they cannot be early reduced to the corresponding ones of the vertex, are classed among the presentations of the trunk of the body.

As regards *the temple*, if the occiput is at the left and in front, we make use also of the left hand, and direct it very far back, so as to embrace the forehead, as has been said above. When the occiput is behind, we push up the temple to its fullest extent, with the left hand, and endeavor to draw it slightly forward. The right hand should be used in the same manner if the occiput corresponds to the right half of the pelvis.

The *forehead*, holding a middle place between the presentations of the face and vertex, also requires the left hand whenever the face looks to the right, and the right hand in cases that are the reverse.

The *occiput*, having fully engaged, requires the left hand when the fontanelles are at the right, and the right hand in the reverse positions. The hand, semi-pronated, passes along the right side of the pelvis in the first case, the left side in the second, and endeavors to reach the forehead, or at least the bregma, which it immediately embraces in order to bring the head towards the corresponding iliac fossa.

ART. VII.—SUMMARY OF VERSION BY THE FEET IN CEPHALIC PRESENTATIONS.

Whence it manifestly follows that in turning by the feet there can be only two positions of the head; therefore, as these two positions themselves, as to their practical indications, differ only in one requiring the right hand more particularly, and the other the left hand, and as it is only necessary to transpose to the right hand the rules already laid down for the government of the left—it is clear, in point of fact, that all the manœuvres of the head are naturally reduced to a single one, and that by multiplying them, we naturally fall into fastidious repetitions, evidently of no use, and fit for nothing but to overload the memory of the student.

ART. VIII.—OF VERSION BY THE FEET IN PRESENTATIONS OF THE TRUNK.

Although it may not be certain that no case has been seen, in a well-formed pelvis, where the trunk of the fœtus was so situated that the head was turned directly backwards; although it is difficult to conceive of such a phenomenon, an error was committed by those who maintain that the same holds good of the anterior part of the pelvic circle. The ossa pubis being lower than the sacro-vertebral angle, and the soft parietes of the abdomen being very distensible, the posterior concavity of the symphysis does not, like the projection of the spine, repel the head towards the sides of the median line, and admit of its fixing itself directly in front.

Besides, this last-mentioned position has been many times met with. To the proofs already in possession of the profession on this subject, I might add several more; but I shall content myself with citing only one. A woman, in her fourth pregnancy, and whose former labors had exhibited nothing peculiar, continued several days in labor at my amphitheatre; she was carefully attended by the students, and all of them had an opportunity of satisfying themselves that the right shoulder was at the orifice, while through the remarkably thin parietes of the abdomen the head could be felt almost naked, above and in front of the symphysis pubis. However, as these positions are rare, and do not at all alter the fundamental

rules of the manœuvre, I shall refer all the presentations of the trunk, as I have done those of the head, to two principal ones: namely, a left lateral one, comprising the first and fourth of MM. Maygrier, Capuron, Dugès, and Madame Lachapelle; and a right lateral one, to which the second and third of the same authors must be reduced.

In fact, what does it matter to the hand with which we operate, whether, in presentations of the side, for example, the head is a little nearer or a little further off from the anterior or posterior median line of the pelvis? If we wish to take hold of the posterior surface of the child's legs, we shall still be obliged to deliver in the first position of the feet if we use the right; and in the second if we use the left hand. As we always have to bring the child as near as possible to a transverse position in turning, there will be rather more difficulty in those cases where it is farthest removed from that position, and rather less where it is nearest to it; but there is no other difference, and surely that is not enough to justify the importance attributed by modern writers to the question whether the cephalo-anterior positions of the trunk ought or ought not to be admitted.

I have already pointed out the reasons that induced me to admit the possibility of presentations both of the anterior and posterior surface of the fœtus; although they in reality require the same manœuvre as those of the lateral regions, I shall say a few words about them notwithstanding, and successively pass in review the positions of the side, the posterior and anterior surfaces, taking care meanwhile to dwell only upon those to which a major part of the others ought to be reduced in operating.

§ 1. PRESENTATION OF THE SHOULDER AND SIDE.

By following a numerical order in indicating positions, so much confusion has been introduced, that it is almost impossible for students to understand each other if they happen not to have studied the same books. Thus, to speak only of positions of the trunk, in Baudelocque's first the head is in front, and to the left according to Maygrier, and directly to the left according to M. Gardien: now, as this mode of proceeding is entirely arbitrary, and as nothing can prevent one accoucheur, if he chooses, from calling that a first position which another chooses to denominate the third, I have thought I might arrange all the shoulder positions under the titles of *cephalo-pubic*, *cephalo-vertebral*, and right or left *cephalo-iliac*. This is the way to avoid all ambiguity, and reduce to their just value the numerous classifications which have successively appeared in France since the time of Solayrès.

A. Positions of the Left Shoulder. 1. *Left cephalo-iliac position.*—In this position, the head, which is on the left side, may be stopped above the *foramen ovale*, the sacro-iliac symphysis, or even the iliac fossa; being referable to the corresponding varieties of the vertex positions, its different shades require to be operated on like the left occipito-iliac position. Only instead of the head, it is the shoulder that is to be pushed up, and, instead of placing the thumb and fingers on the temples, they are to be applied to the back, and to the fore part of the thorax; in fact, turning in this case differs from that in vertex positions, only that the head is already raised or reversed, and that the first stage of the operation is effected by natural means.

The left hand is to be introduced; the thumb is to be pressed on the anterior face of the shoulder or the sternum; the other fingers slip behind the scapula or chest, and the little finger remains turned toward the child's occiput.

To conform to this rule, the hand ought to be introduced half supine, or in a more or less complete state of supination or pronation, according as the vertex happens to be near the symphysis pubis, the sacro-vertebral angle, or the iliac fossa. After having raised up the shoulder, taking care at the same time to push it backwards, so that the anterior surface of the fœtus may look somewhat down-

wards, we should endeavor to push the head towards the middle of the iliac fossa, provided it were at too great a distance from it before, which often requires a skillful combination of the efforts of the hand that presses upon the hypogastrium with those of the one which is operating in the womb. The thumb then abandons the sternum, is placed alongside of the index, and in the remainder of the procedure we act as was directed in speaking of the left occipito-iliac position.

When the head is found completely in front (left dorso-iliac position), or even somewhat near the right acetabulum, we may proceed as above; only that, in order to get hold of the right shoulder, the hand is in a forced state of supination, and that, after having lifted it up, the head is to be carried from right to left, as far as possible, towards the iliac fossa, by acting chiefly with the thumb exactly applied to the sternum.

In cases where it is situated very near the posterior median line (right dorso-iliac position), it is very difficult to bring it back to the left extremity of the great diameter of the pelvis, because the thorax only moves, whereas the head retains its primitive position. To overcome this difficulty, we are to support the upper part of the chest with the thumb and forefinger, while the others are extended as far as the occiput, and thus serve to push from behind forwards, and from right to left, as if we wished to tilt it over from the occiput towards the chin.

2. *Right cephalo-iliac position.*—The manœuvre is generally much more difficult in this than in the preceding position, for it can scarcely be terminated without first being converted into a left cephalo-iliac position, or into a position of the right side. But, in either of these cases, the change we are obliged to make in the situation of the fœtus is so great that, if it be somewhat compressed by the uterus, its life is often found to be exposed to the greatest dangers. This is certainly a case where it would be proper to bring the head to the orifice, and afterwards apply the forceps, instead of turning and delivering by the feet.

However this may be, provided the waters have not been long discharged, if the membranes are not ruptured, and lastly, if the child is to a certain extent movable in the womb, the best practice is to reduce it to a dorso-sacral or left dorso-iliac position: this may be effected in two different ways.

Unless the head happens to be nearer to the sacro-iliac symphysis than to the right acetabulum, we might, by turning the hand into a very forced state of supination, get hold of the shoulder, as in the cases heretofore treated of, that is, so that the thumb may tend to reach the sternum whilst the fingers remain behind the thorax, the little finger being towards the head; then we act by raising it upwards a little, the vertex in front; the hand afterwards assumes, during the operation, an attitude of pronation, which is more and more complete in proportion as the occiput moves more towards the left iliac fossa.

Should it be too difficult thus to move the cephalic extremity of the child, from right to left, over the major part of the anterior semicircle of the pelvis, we might, after raising the shoulder and head above the pubis, go immediately in search of the feet or knees, proceeding along the left side. Having got hold of the legs, the act of turning would compel the head, which, besides, is already repelled by the forearm within the uterus, to rise upwards and take a situation towards the fundus of the womb. But in this case special care should be taken not to permit the child's back to turn to the posterior surface of the womb.

Should the shoulder be so disposed of that the head were to be found above the right sacro-iliac symphysis, that is to say, in the third position of Maygrier, or still nearer to the sacro-vertebral angle, the left hand, introduced in a forced state of pronation, might attempt to raise the shoulder, and move the head from the right sacro-iliac symphysis to a situation above the left sacro-iliac symphysis; but, although this manœuvre may sometimes be found rather easier than the

former one, it should be stated that it is perhaps a more dangerous one; for, provided the last two or three fingers should not act with force upon the occiput while the thumb and index are pushing against the upper part of the chest, there is a risk of doing nothing more than effecting a retroversion of the head on to the back while endeavoring to displace it.

Should the membranes have been long ruptured, the womb strongly contracted, and the child not to be moved but with very great difficulty, there is a third manœuvre that ought then to be preferred, and which perhaps it would be well to employ in other cases; it consists in pushing the shoulder up with the right hand, from behind forwards, as if to make the spine turn upon its own axis; then trying to reach the right side by passing along the front of the chest, while the womb is forcibly pushed backwards with the left hand; lastly, in taking hold of the feet, the right one first, so as to bring them down in the first position.

3. *In conclusion.*—All the positions of the left side may be managed with the left hand. By not losing sight of the rule that the thumb should always correspond to the sternal surface, the fingers to the dorsal surface, and the cubital edge of the hand to the child's head; and by remembering that, previously to going in search of the feet, the head ought to be moved as near as possible to the left iliac fossa, the practitioner will be aware of everything that it is essential to know concerning the manœuvre for the left lateral surface. Should he make use of his right hand, as his first object would be to raise up the left shoulder, so as more readily to reach the right shoulder and side, the case would evidently be converted into a right shoulder position, properly so called, which I am now about to treat of.

B. *Positions of the Right Shoulder.*—What I have now said of the left shoulder positions being strictly applicable to those of the right shoulder, it would be superfluous to enter upon new details concerning the latter. I shall merely remark that, in the present case, the right hand performs the part which was entrusted to the left in the former case; that the head is to be moved towards the right iliac fossa previously to searching further for the feet; lastly, that the fœtus should be delivered in the first and not in the second position of the feet. After all, to save the necessity of particular description, in shoulder positions it is enough to remember that the right hand always goes to the right side, and the left hand to the left side, and that in all cases the fingers ought to be situated in regard to the fœtus as has been already mentioned.

I will, however, observe that these rules cannot be absolute; that a knowledge of them merely renders the operation rather easier; that they may be modified in a great variety of ways; that they are principally established for young physicians who are as yet insufficiently enlightened by experience, and who require a certain number of clues to lead them through the labyrinth of practice; lastly, I will state that, in cases where the hand is carried into the womb previously to the rupture of the membranes, whether the child presents with its right side or its left side, and in any position of the shoulder whatever, we may arrive at the feet directly, and almost with equal facility with either hand.

§ 2. PRESENTATION OF THE STERNUM.

A. The *cephalo-pubic position* of the sternum might, rigorously, be as well reduced to the left cephalo-iliac, as to the right cephalo-iliac position; but it is generally reduced to the latter, because it is terminated in the first position of the feet.

B. In the *right cephalo-iliac position*, the right hand must be made use of. It is to be introduced supine if the head is in front, prone if in the contrary situation, and betwixt these two attitudes provided the head be fairly to the right. The part that is engaged must always be pushed back until the trunk of the fœtus, instead of being convex on its anterior face, shall become concave;

then the operator should endeavor to reach the right shoulder behind to which the fingers are to be applied, while the thumb rests on the anterior surface of the thorax; afterwards, nothing more remains to be done than to swing the bis-acromial diameter, so that its posterior extremity may turn downwards, by acting upon it as upon a lever of the first kind, whose fulcrum is represented by the thumb, and the power by the fingers; this being done, the position differs in no respect from the corresponding one on the right side, and is to be managed in the same way.

C. In the *left cephalo-iliac position*, the left hand does what the right should do in the opposite position; it pushes up the breast, gets hold of the left shoulder, draws it down a little, and if the head were too far from the iliac fossa, it brings it nearer to it, obtains a dorso-sacral position of the left shoulder, and the rest of the manœuvre presents nothing of a special character.

§ 3. PRESENTATION OF THE BACK.

A. *Right Cephalo-Iliac Position*.—If the head is to the right, in front, or to the rear, in positions of the back, the right hand is to be made use of as in positions of the sternum, and according to the same rules. Consequently, it is introduced half prone, supine, or more or less completely prone, according as the head looks to the right, in front, or to the rear; but in such a manner that the thumb may always pass in front of the right shoulder and breast, while the fingers rest upon the dorsal surface. In the first place, this shoulder is to be brought down so as to make the other rise; it is then to be repelled, by acting on it as upon the end of a powerful lever, which the thumb tends to move and to oblige the fœtus to turn on its great axis, until the position of the back is converted into a corresponding or dorso-sacral position of the right shoulder.

This movement requires great care, for, if the head does not go with the trunk, the cervical portion of the spinal marrow runs the greatest risk of being lacerated, or violently twisted in the second stage of the operation; this danger is to be avoided as far as possible, by pushing the chest very far backwards and upwards, so as to give great depth to the curve of the anterior surface of the fœtus; or, if it should be absolutely necessary, by getting hold of the head itself to force the face to turn forwards and downwards.

B. *Left Cephalo-Iliac Position*.—The left extremity of the bis-acromial diameter is taken hold of, the fingers on the back, and the thumb in front of the left shoulder, or sternum, and the cubital edge turned towards the occiput; while the trunk is turning on its occipito-coccygeal axis, we should endeavor to comprise the head in the movement, and, if necessary, bring it near to the iliac fossa. In one word, the left hand here acts as the right hand does in the opposite positions; it converts positions of the back into positions of the left side, which it afterwards terminates by delivery in the second position of the feet.

ART. IX.—OF THE MANŒUVRE IN PRESENTATION OF THE PELVIS.

The manœuvre in positions of the pelvis reduces itself in some sort to that of the last stage, or stage of extraction, in the head or trunk positions; I need, therefore, only add a few words to what has been said farther back, in order to conclude all that concerns it.

Although, strictly speaking, the right hand might be easily made use of in all the positions which it is proper to terminate by the first of the feet positions, and the left only in the opposite case, it is, notwithstanding, better to do the very reverse. We can, with the right hand, in all the right dorso-pelvic positions, push up one buttock, or even both of them towards the right iliac fossa, reduce inclined to central positions, and take hold of the limbs by their anterior surfaces, without being obliged to assume an awkward attitude; whereas with the left hand

the breast could not be raised without difficulty, and it would be still less easy to reach the feet, if they were at some distance from the orifice. Lastly, by using the hand that corresponds to that side of the mother's pelvis towards which the child's heels are to be turned, while coming down, a half prone position brings the palmar face of the fingers in front and on one side; the operator is, consequently, in the most favorable condition to prevent the back of the fetus from moving towards the sacro-iliac symphysis, and, on the contrary, to compel it to turn towards the acetabulum; the operator can also pull with all the force that circumstances may require, an advantage not to be obtained by adopting an inverse order in the application of the hand.

Whenever, therefore, it is intended to deliver in the first position of the feet, that is, whenever the child's back shall look more or less towards the left of the pelvis, or even directly towards the pubis or sacrum, the left hand should be introduced; and the right hand in all other cases.

§ 1. PRESENTATION OF THE FEET.

Inasmuch as the positions of the feet previous to the rupture of the membranes are scarcely distinguished from those of the breech, there can hardly be any question concerning them until after this rupture. The accoucheur then may be called under two different circumstances, which it is important that he should not confound with each other: either the feet have not cleared the vulva, or the trunk has more or less completely emerged.

In the former case, if the two feet present together at the orifice, or in the vagina, all he has to do is to take hold of them and draw them down so as immediately to extend the legs, and that the hips may soon arrive at the inferior strait. Provided only one of them can at first be found, some attempts should be made to discover the other, which it is rarely difficult to do. Should the attempt not succeed, the first one should be brought down, then secured by a fillet, and made use of as a guide to the second, which may perhaps be found reversed towards the breech, in a state of abduction, or with the leg and thigh doubled up on the belly, &c.

In the latter case, the presence of the feet offers no particular indication; nothing is to be done, as was mentioned in speaking of turning in head positions, but to pull the different parts that are still unexpelled downwards.

A very necessary precaution, when extracting a child by the feet, is to act in such a way that, at the moment when the child is passing the straits, the occiput may look towards some part of the anterior semi-circumference of the pelvis. The thing is easy; and no skillful practitioner will ever fail in bringing it about when he goes in search of the feet in a head or trunk presentation. But it is no longer the case where the pelvis presents spontaneously at the superior strait; mistimed or unskillful tractions may have been instituted in his absence, or, when he reaches the bedside of the patient, the hips may have been already expelled and the face turned in front.

The position of the feet where the child's dorsal surface looks backwards may give rise to three particular cases: 1. The feet are still at the superior strait, or in the vagina. 2. The delivery, if left to the natural powers, may be complicated with no accident, or give no evidence of requiring the assistance of the hand, until the lower extremities, or even the hips, are born. 3. Turning has been attempted on account of some position of the head or trunk, the feet having been brought down, but the operator has failed to make the occiput turn in front.

Let us here suppose the first hypothesis. After having got hold of the limbs in the manner heretofore mentioned, the back ought to be directed first towards the sacro-iliac symphysis or iliac fossa, then towards the acetabulum. With each pull, as the hips approach the perineal strait, they are taken in both hands, and

in the interval betwixt two pains the whole trunk is pushed upwards again, as if we wished to make it mount up above the superior strait. As soon as the womb, which is thus momentarily distended, appears to be about to contract, the pelvis should be suddenly pulled down, while at the same time we endeavor to make the body of the child revolve on its axis. In this way, says Baudelocque, the cavity of the womb is first enlarged, and, as we endeavor in the next place to empty it suddenly, the organ is in some measure surprised, and cannot contract so fast as to prevent the head from following the turn we give to the body. These attempts are to be renewed from one to ten and even fifteen times, according to the necessity of the case, that is, until the anterior position has taken the place of the posterior one, or until the impossibility of effecting the change is ascertained. When the attempt proves successful, no particular difficulties remain, and the rest of the manœuvre is the same as in feet presentations in general. But I shall show hereafter that Baudelocque was certainly mistaken in the importance of this manœuvre.

When all hope of succeeding is abandoned, we must even be resigned to let the face come along uppermost; we must redouble our precautions against letting the chin depart from the breast; the arms should be disengaged, the hindermost one first, by pulling them from behind forwards, and in a direction from the head towards the thorax; immediately after this, two or three fingers of each hand should be applied to the two extremes of the occipito-mental diameter; we should endeavor to push the head upwards, or raise it so as to give it more freedom, and finally make it execute a pivot movement, by which the face is gradually carried backwards.

Supposing it should be found impossible to turn the occiput in front, the shoulders and chest should be pulled downwards, and rather backwards than forwards, so as to deliver the chin, the forehead, and the anterior fontanelle before the occiput. If these tractions should prove incompetent, the forceps should be had recourse to.

In the second case, provided the head has not yet arrived at the straits, we should act as in the first case, that is, the fœtus should be pushed upwards every time we wish to give the body a turn; but we must expect to succeed still more rarely.

In the third, these attempts are of no use. We may neglect them altogether, and immediately disengage the arms if it be not already done. We then conform, as to the head, to the principles established above. Some of the fingers must be applied to the chin, which we endeavor to turn from right to left, while with the other hand we act on one of the shoulders or the occiput, so as to favor the complete rotation of the head and trunk, and then proceed to deliver.

§ 2. PRESENTATION OF THE BREECH.

As the knees occasion no difficulty, by their presentation merely, in delivering a lying-in woman; as their presence does not at all alter the principles, nor even the practical details of the manœuvre; as one or more fingers are all that are required to disengage them, or give them a regular position when in the vagina; and, lastly, inasmuch as, where this presentation does not return into the class of breech presentations, it is always an easy matter to reduce it to the presentations of the feet, I shall not devote a special article to the consideration of it, but shall pass at once to the consideration of breech presentations.

The left hand should be preferred in breech presentation, as in those of the feet, whenever the back is turned more or less to the left, and *vice versa* for the right hand. The child being doubled up, with the thighs and legs raised up along the abdomen, if the hips have cleared the orifice of the womb and descended into the excavation, or even to the inferior strait, the groin that is most backwards should be hooked with a finger or two, while the thumb of the same hand is

applied to the outer surface of the anterior hip. If any resistance is experienced, there will be some advantage in substituting one or two fingers of the other hand for the thumb, and if that will not answer, the blunt hook should be made use of. When the breech is so advanced that we are unable to push it up, to seize the feet, or pull on it with the fingers, Peu strongly recommends a fillet to be passed above the groin, or the blunt hook; but the application and efficacy of the fillet would be less easy and sure than that of the hook itself. As soon as the hips have cleared the vulva, it is generally very easy to extend the limbs, and the rest of the process is merely a footling delivery.

Previous to the rupture of the membranes, and where the breech is not yet so far engaged as to render it impossible to push it up again above the superior strait, whether the fœtus be doubled up or merely in a squatting attitude, we should always endeavor to bring down the feet.

In order to push the breech up, the hand is placed under it and along the posterior surface of the thighs; the thumb is placed on the anterior and the fingers on the posterior hip; or, where the fœtus is still very movable, and very high up, it is enough to apply the thumb under one of the ischiæ, and the fingers under the other. The pelvis is then pushed towards the iliac fossa that corresponds to the hand that is made use of; then, by passing along on the outer surface of the limb that is nearest the sacrum, the feet may be got hold of and brought down, so as to allow us to embrace the fore part of the legs with the hand, and deliver, as in a corresponding position of the feet; that is, in the first if the left hand is used, and in the second position if it is the right hand.

In conclusion, the manœuvre of the pelvis presents us but two particular indications: 1. To draw it down with the fingers or blunt hook, when it is too low down to be pushed back again. 2. To displace it whenever the thing is possible, so as to let the feet pass down first. In both cases, when we employ only one hand, the palm of which is directed so as to slide up along the child's abdomen and breast, we surely require for our guidance only the following rule; that the fingers shall always be applied to the ischium or hip that is *opposite*, and the thumb to the ischium or hip that *corresponds* to the hand that is operating. Were the limbs found to be reversed upon the dorsal surface, instead of being turned towards the abdomen, the thighs should be acted on as we do on the arms, when disengaging them at the inferior strait; the thumb fixed in the groin might serve as a *point d'appui*; the fingers, being moved along towards the ham, would represent the power, and the knee would be obliged to descend, drawing the leg along with it. The two limbs ought thus to be brought either together, or in succession, to their natural position. In whatsoever way they may present, it is always better to make them descend together, than one by one; however, where too much difficulty is experienced, it would be imprudent to persist in endeavoring to make them descend simultaneously. If one of them should have already escaped, the anterior one, for instance, and it should be impossible to get the other one down, the delivery, in most cases, would not be rendered on that account much more difficult: it should be made use of to draw down by, while the index and medius fingers, or a blunt hook, should be applied to the posterior groin, as has already been mentioned. If, on the other hand, the anterior member only should be retained at the superior strait, it is still more important than in the former case to draw it near the other limb, because we cannot so readily reach the groin in this situation, and especially because the action of the blunt hook is not so advantageous.

ART. X.—GENERAL REMARKS ON VERSION.

In concluding this article, I shall take the liberty of again suggesting to students and young accoucheurs that if, in turning by the feet, they wish to avoid the risk

of often killing the *fœtus*, they ought never to lose sight of the fact that the head cannot rotate on the spine more than a quarter of a circle, without luxating it, or straining the spinal marrow in a very dangerous way; that, in general, it does not follow the motion of the trunk of the body, by means of which attempts are made to rotate it; that it is impossible, in any case, to affirm that it has rotated, merely on the ground that the back, for example, has been turned from behind forwards; consequently, that, in any species of manœuvre whatever, we should commit a very great error if we caused the child's body to turn more than a quarter of a circle, without being assured that the head accompanies it in its movement.

It having been proved by observation that the death of the child, in turning by the feet, arises most generally from want of circulation, either from compression on the cord or from detachment of the placenta, some individuals have tried to prevent it by establishing respiration in the womb itself. Pugh is the first, I think, who entertained this idea; Bigelow, who again suggested it, introduces his two fingers into the mouth, for the purpose of opening it, and he carries into it a tube, as Pugh recommends. He can rely, he says, upon five cases of success. A. Baudelocque, who gives the same advice, insists also on cutting the cord; but respiration, either natural or artificial, is too difficult to establish in the womb of the mother, and the section of the cord, before the escape of the child, is too dangerous to admit of such a remedy with impunity.

Neither can I leave this subject without returning for a moment to the consideration of the manœuvre recommended by Baudelocque for bringing the child's back in front, and which was spoken of some pages back. It would, in my opinion, be wrong to rely upon such attempts. If the womb is but slightly contracted, it is useless to act in that way. When, on the contrary, the *fœtus* is forcibly compressed, the force which we exert upon it from below upwards seldom extends as far as the head, and even then it certainly does not change the general disposition of the womb, so as to render the child at all more movable. This is not all; if it be not certain that we shall be enabled, in this way, to render the rotation of the occiput easier, it seems to me manifest that the abdomen, the thorax, and even the cervical portion of the spine would not always safely bear the various kinds of pressure and the twists to which they will necessarily be subjected. Lastly, to express my unreserved opinion, I will say that this precept of Baudelocque seems to me to be more the fruit of imagination than of observation, and that modern writers ought, previously to copying it, at least to have called it in question and submitted it to a new examination.

In his memoir on version, and delivery by the feet, in which the back of the child looks to the back of the mother, M. Michaelis remarks that all the German authors, and especially Siebold, recommend us to pay particular attention to the direction in which the child is disposed most readily to turn, and to endeavor to bring the face towards the sacrum. If the head and the chin are placed under the symphysis pubis, according to M. Ritgen, it must be instantly changed, for the compression of the cord would inevitably cause the death of the child. This is also the opinion of Mauriceau and Levret, as well as that of Baudelocque.

But this conversion is not always followed with success; for, notwithstanding twelve years of practice, says M. Michaelis, it has been impossible for me in many instances to attain it. We confess it will be difficult when, in looking for the child, the uterus is found to be strongly contracted, and the waters discharged.

When we wish to restore the face to the sacrum, it is only necessary to turn the vertebral column without acting on the head.

These false presentations almost invariably occur from a bad direction or malformation of the uterus, which, in women whose abdomen is pendent, form a

curve, with the concavity towards the vertebral column or the diaphragm, and with the convexity inferior or anterior.

Suppose we could turn the head of the child by acting on the breech, there would be still fear of the arm taking an unfavorable position—coming across the neck, for instance, and *becoming lodged* between the pubis and the neck.

When we are only able to act on the breech and shoulders, the head frequently descends into the vagina at once, whence it follows that we must give up all attempts when the version cannot be conducted with ease.

We must carefully avoid, also, during this operation, 1st, compression of the cord; 2d, bringing down the arms; 3d, bringing down the head in an unfavorable position. The first case is rare. The cord slides from right to left, and does not remain stationary at the top of the chin. Attempts at turning here prolong the compression; it is important, then, to push it away from the pubis, in order to obviate all the inconveniences that might result from it.

The arms sometimes descend of themselves. When the labor does not advance very rapidly, they must then be disengaged by turning the child on the side. In two cases, M. Michaelis assures us he brought them down by turning them backwards, pulsation having ceased at the cord; the head can descend in this position as easily as in any other.

Sometimes the chin descends behind one of the horizontal branches of the pubis, and then the conversion into an occipito-anterior position is easy.

More frequently it is hooked on the symphysis; but the anterior part of the neck, when applied to the symphysis, allows the occiput to pass into the vagina, and then the face first turns to the side of the pelvis, then to the sacrum, and the delivery resembles that which takes place in ordinary cases.

The objections that might be raised against this doctrine are as follows: 1st. The child may be destroyed by the compression and extension of the neck; but this compression does not take place on the trachea. The accoucheur takes care to raise the child on the belly of the mother, and the neck only remains a few minutes in a position which lasts several hours in presentation of the face. 2d. We are obliged to rely less on the powers of nature. M. Michaelis assures us that every time that he has used the forceps in such cases, the head descended with such facility that he regretted not having left it entirely to nature. In applying the forceps, we follow the direction of the neck, and the body of the child should be raised horizontally by an assistant, and, contrary to the opinion of Froriep, the instrument must be placed below the child. If it is denied that the occiput can be arrested by the promontory, the author replies that he has never met with an example of such a difficulty. It is then necessary to see which would be the more easy to disengage, the occiput or the chin. In pushing it above the symphysis pubis, we are always sure to dislodge from the promontory the posterior part of the head.

In recapitulating, then—in the case of version or delivery by the pelvis, if the child turns with difficulty, it is not necessary to exercise so much force as to run the risk of twisting the spinal column or the neck, for it may be delivered in this false position.

As to the head especially, it is not necessary to do anything to prevent it from making this false movement. Whilst the occiput and chin are on the same level, the chin may be made to descend as in ordinary cases; but where the occiput has descended into the hollow of the sacrum, it is not necessary to push it back, as the delivery can take place in that way.

When the whole head has descended into the excavation, it is absurd to wish, in imitation of Siebold, to push the occiput upwards, for nothing is more easy than to accomplish the delivery with the forceps, which may be always applied by placing them beneath the body of the child. This doctrine, which I have

explained partly from my own reflections, in consequence of the facts observed by Leroux and M. Eckardt, seems to me to deserve the attention of practitioners.

Version in multiple pregnancies offers no peculiarity which will not be found explained in the articles on Pregnancy, the Fœtus, and Dystocia. Mauriceau, G. De la Tourette, and many others, recommend that the limbs of the different children should not be mistaken one for the other; but, as Dionis has already said, every precaution on this subject is useless, since each fœtus has its own envelop, and there is no danger of the limbs becoming confounded, except in very rare cases, when the membranes of each rupture at the same time. It is far from being necessary to employ version in case of twins. M. Lacroix says that a woman, thirty-two years of age, was delivered of four living children at the eighth month, 15th of October, 1833, at Saint-Sardore (Tarn-et-Garonne). The first weighed five pounds and a half, the second four pounds and a quarter, the third three pounds, and the fourth two pounds and some ounces. All were girls, and were born without assistance.

ART. XI.—PRESENTATION OF THE ARM.

The premature escape of the arm does not, of itself, constitute a presentation, and forms only a complication of other presentations, particularly that of the shoulder. Both arms have been seen but rarely to present together at the vulva; unless brought there by inconsiderate manœuvres, they could not both thus descend except in back or sternum presentations. It is less rare to find one at the vulva, and the other simply engaged in the neck. De la Motte, Smellie, and others pretend that they have felt the feet and arms at the orifice at the same time; and M. Capuron even says that some accoucheurs have had the imprudence to pull at the same time on a foot and arm. We see, also, from an observation of Rœderer, that the hand, the foot, and the face may present together. It is at least certain that they may precede the head at the superior strait, and sometimes even at the inferior. If the presence of the hand or arm indicates usually the presentation of the shoulder, it may be nothing more than a complication of the presentations of the head or pelvis. Presentations of the arm are, moreover, very common. We see, in the thirty-eighth chapter of Genesis, that one of the twins of Tamar came thus into the world. These causes may be found in the movements which the woman executes, or the jolts which she experiences towards the end of pregnancy, in the vitiated form of the pelvis, the irregular action of the uterus, and the number of children, or their monstrosity. They are also often met with, as Mauriceau and Portal have seen, after a voyage, or a ride in a carriage after a violent emotion, and among women who are depraved. M. Busch says that it has occurred in six successive labors in the same woman, and the same thing is moreover observed in most vitiated presentations, and in those of the breech.

§ 1. HISTORY AND VALUE.

Until the last century, nothing was deemed more dreadful than the appearance of the arm in the course of a labor; and in our day the common people still look upon such an occurrence as extremely dangerous. But these fears are explained by the fact that, until the time of Levret, it was not thought possible to penetrate into the womb without having previously returned the prolapsed member into its cavity. In reflecting upon the dangers occasioned by the ridiculous or barbarous measures adopted in cases of this kind, can it be believed that Charles de Saint-Germain, Deventer, and Girard of Lyons could have seriously recommended that a piece of ice should be put into the child's hand, and that it should be pinched or filiped, to make it pull its arm back!

Others have invented, at the instance of Albucasis, varieties of forks, or crutches,

&c., to push it up with, by acting upon the chest; the more timid pushed it up to the top of the vagina, and sometimes succeeded in returning it into the cavity of the womb; but their attempts were generally in vain, and the arm, if somewhat swelled, seemed to them to constitute an insurmountable obstacle to the introduction of the hand into the os uteri. Under such circumstances, the old women, and even the physician himself, could imagine no alternative save pulling at the arm until the child yielded, and came away doubled, or until the arm was torn off. Paré advises that the soft parts below the shoulder should be first cut round, and that we should then resort to sharp pincers to cut the bone with; De la Motte recommends us to twist the limb round like the limb of a tree that we might wish to tear off from the trunk; lastly, the most timid were satisfied with making deep scarifications in the tumefied part, so as to lessen its size.

Happily, at the age in which we live, such a dreadful doctrine is held by nobody. Baudelocque and his successors did it justice long ago; and at present it is not without a sentiment of indignation, that we still hear from time to time of practitioners who dare to conform to it in practice. I should not even insist upon this point, had not certain persons had the inconceivable audacity to renew this revolting practice of late years in Bretagne, Normandy, Champagne, and even in the environs of Montpellier, almost at the same time; particularly, had not these practitioners found some defenders in the capital; had not certain persons had the hardihood to publish, in 1826, 1827, and 1828, various pamphlets to justify a conduct so far opposed to tokological doctrines; and had they not anew appealed to the authority of A. Paré, Mauriceau, Deventer, De la Motte, Puzos, Mesnard, Levret, &c., as if the modern accoucheurs had not overturned, without exception, all the reasons advanced by their predecessors in favor of the amputation, or tearing off of the arms!

Portal already maintains that the arm of the child and the hand of the accoucheur never equal the size of the head. A very large arm did not prevent him from passing his hand into the womb, where it became benumbed, and from bringing away a living infant. Peu, who still advises that the arm should be pushed back, as Mauriceau also did, does not advise it to be pulled off. Deventer well establishes the fact that it is not the arm which interferes with the search for the feet; and that it is useless to cut it away when it does escape, as it does no harm. De la Motte does not even think it useful to push it back, and proves, by the observations of Mauriceau and himself, that this repulsion should not be attempted. Puzos speaks precisely as Portal does. Burton says, to cut off the arm is a wickedness which can do no good, and Lemoine declares it to be atrocious barbarity, unless there is an indispensable necessity for so doing. Denman shows that it is neither necessary nor useful ever to perform this operation. In adding to these authorities that of A. Leroy, who boasts that, by the aid of bleeding, he can always effect version without mutilating the child, that of Baudelocque, of Stein, and of nearly all the moderns, it is difficult to find a practice more universally proscribed than the amputation or tearing off of the arm during labor.

I do not intend to deny that it never has been necessary to separate from the trunk a member prematurely escaped, in order to penetrate more readily into the womb; I merely assert that I cannot conceive of such a necessity; that it is impossible to admit of it except where the child is dead; that no matter how much the arm may be infiltrated or swollen, a skillful accoucheur will always be able to carry his hand into the womb without mutilating anything; lastly, that, without being able to say how far the Norman surgeon may have departed from sound practice, we must at least admit that the reasons and proofs cited by M. Roux as his excuse, would be dangerous if taken to the very letter. The bag of waters had been broken only a few hours; no serious attempt at version had been made. The woman was in no danger. There had been neither convulsions

nor hemorrhage. Similar experience of other authors did not prove to him that amputation of the arm was then indispensable. This unfortunate woman, of whom the journals speak, was delivered alone in a bath, although version seemed impossible after amputation of both arms. A kick given to the accoucheur, on another occasion, does not prove by any means that it is indispensable to amputate both legs in order to deliver the child. In saying that, if the arm is not too much mortified, it may be twisted off or cut away with scissors, Smellie does not demonstrate the necessity of the operation, and we may be permitted to doubt whether such was the fact in the case reported by Hoskins.

It seems to me, moreover, that we may be mistaken as to the condition of the parts in such a case. We may think, if we attend to those who agitate this question, that all the difficulty is to be found in the neck of the uterus. Nothing is, however, more incorrect. If the neck was only contracted so as to hold firmly the upper portion of the arm, time, venesection, baths, emollients, opiates, belladonna, and well-directed efforts, would certainly overcome its resistance. But it is rarely thus; most frequently the uterus is contracted throughout very firmly on the different parts of the child, after the manner of a glove. It is necessary to overcome first the external orifice, then the internal, then a third circle of uterine fibres, then a fourth and a fifth, &c. In the passage of the fingers or the hand, it is frequently necessary to contend against the uterine contractions, line by line, point by point, from the lower orifice, even to the fundus of the organ, or from the shoulder to the feet of the fœtus. It is not always the case that the strongest contraction is at the os uteri. Three times, and especially in a case with M. Layraud, I have found it on a level with the internal orifice. In a case to which I was called by M. Paris, the greatest difficulty was about the breast of the child. I delivered another woman when the thighs were embraced with so much force that I was fearful that the fundus of the uterus would be lacerated in my efforts to reach the feet. To pass the os uteri is then a small part of the operation; it is above that the greatest and most numerous difficulties are found.

The ablation of the arm in such a case would free the vagina and even the entrance to the uterus, if it were pushed down, and if it formed a pad around the limb, but the other portions of the uterus would experience no relief. The difficulties of version would, in this respect, continue. We see, indeed, that Saviard, who succeeded very well in one case, was obliged to practice embryotomy in a second after having removed successively both arms. Coutouly could not reach the feet until after he had incised the mouth of the uterus in many places. This last fact, of which Duchateau and Joubert speak, proves absolutely nothing, as we may perceive, either in favor of Coutouly or of brachiotomists in general. When the two arms are successively removed, or even one of them, as was done by M. Moreau, and as M. Delormel thought should also be done—or when the arm, the clavicle, and the scapula, are at once taken away, as Boquis and Brueil have each done—a more favorable space is doubtless obtained, but this alone does not always suffice. Besides, if after all of this the fœtus should be born alive, might we not be authorized in concluding that the womb was not contracted so forcibly, nor for so long a time, as to render such a manœuvre necessary? Could not the child, which was thrown behind the door with both arms amputated, and which, according to Pen, lived eight days in the house of its assassin, where it was carried, have been extracted without this mutilation? Was amputation of both arms necessary in the case which was delivered by the head, and alive, in the presence of Picard? What do the difficulties prove which are met with by practitioners so little experienced in this kind of manœuvre as MM. Allora, Rambert, Fermand, and Malvani? And what shall we reply to M. Samel, who, having failed twice, insisted upon it that in similar cases version would be impossible without amputation?

The removal of the arm, however, does in reality facilitate version, and it is

thus: The *point d'appui* which the arm furnishes to the uterine contractions being destroyed, the displacement of the fœtus becomes evidently more easy. It cannot be disputed that the efforts of the hand against the breast will then push up this part of the trunk with less difficulty. The child being once moved, and in part disengaged from the superior strait, where it had been fixed, affords less resistance to the introduction of the hand and the search for the feet. In this point of view, then, amputation of the arm facilitates version, while it can be of no advantage if it only renders the mouth of the uterus more accessible to the fingers of the accoucheur.

This question merits another view. If the presence of the arm is not a principal obstacle, nor of such a nature as to render version absolutely impossible, it coincides with a presentation which carries with it great danger both to the mother and the child. It is consequently necessary to compare its dangers with those which belong to forced version, with or without ablation of a limb. The violence produced by the hand exposes the womb to contusions, to inflammations of all kinds, to mortification, to softening, and especially to ruptures. We rarely reach the feet without pushing in the chest or abdomen of the fœtus, which, together with the contusions produced by its doubling on itself, and the necessary traction, almost always causes it to perish before the version is completed. The amputation of the arm allows us to lift up the chest a little more easily, and create a sort of vacuum (*vide*) in the womb, and to avoid some of the dangers attending the operation without getting rid of them altogether, since it is equally necessary to produce version and to extract the child.

On the whole, I think that it is better to favor the mother at the expense of the child, than the child at the expense of the mother. I will then suppose the following dilemma: that it is really impossible to overcome the constrictions in the different parts of the uterus, and that in such a case we cannot conceive that the infant is still living, or that it can be delivered alive; or, on the other hand, that the child is still alive, and that version may have been possibly successful without mutilation. In the first place, is it to the removal of the arm that we should have recourse? I think not. The fœtus, being dead or sacrificed, should be extracted with as little risk as possible to the woman. I would, consequently, after such a decision, give up version to try evolution, or to practice decapitation.

Traction on the arm after the manner of F. de Hilden, or of Fichet de Fléchy; a fillet passed above the trunk, as advised by Peu; or the blunt hook applied on the upper part of the chest, should be successively tried in order to bring down the abdomen and breech, or even the head, if it shows the least disposition to engage. The inutility of such attempts being duly established, we may accomplish decapitation either with a long probe-pointed bistoury, straight or curved, or with a large pair of scissors, or with a common scalpel, the point and cutting edge of which should be guarded with the fingers during its introduction. If this should fail, the spine may be ruptured by continued traction with the blunt hook, as in the case cited by MM. Ouvrard and Laroche. We may afterwards effect the extraction of the trunk by the aid of the crotchet, or by pulling on the arm or arms. The hand or the forceps carried into the womb, as Asdrubali did five times with success, will suffice to bring away the head. It must be well understood, however, that such a proceeding should not be resorted to, as first advised by Heister, before the death of the fœtus has been established, not by the size, the color, or the gangrenous appearance of the arm, but indeed by the duration of the labor, the force, extent, and permanence of the uterine contractions, and the flaccidity and want of pulsation in the umbilical cord; nor should it be attempted without having first become satisfied of the impossibility or danger of version, and of all the other plans above mentioned, with a view of compromising as little as possible the life of the child. Evisceration, or embryotomy, properly speaking, and the division of the trunk, which Burns prefers, should be reserved as a *pis aller*, or last resort.

§ 2. MANIPULATION.

In a few words, we may state what course should be pursued when a hand or arm appears at the orifice, whether in shoulder presentations, or with the head or feet.

When a hand appears at the vulva, and it is impossible to ascertain certainly that the corresponding shoulder is at the superior strait, far from becoming alarmed, and pushing it back, it is, on the contrary, best to secure it with a fillet; the fillet being fixed, the shoulder is next pushed up, and we proceed to get hold of the feet, just as if there were no complication whatever. As we draw the lower extremities downwards, the arm mounts upwards, and the fillet serves to pull it along at the same time with the feet after the version is complete.

A. *The Arm with the Head*.—Although the descent of the arm along with the head is not a serious cause of dystocia, there are, notwithstanding, cases where the course of the labor is really embarrassed by such an occurrence. Consequently, we may get rid of the complication if possible. If called before the superior strait has been passed, there is no difficulty in returning the child's hand into the uterus, and retaining it there by means of a few fingers until the head is well engaged. If called at a later period, great difficulties are sometimes experienced: in some instances, the thing is impossible. We must, under such circumstances, endeavor to make the hand slip along the forehead towards the sacro-iliac symphysis, or obturator foramen of the side where there is the least pressure; but should some new difficulty arise, rendering the immediate termination of the labor necessary, the forceps should be applied, without regard to the presence of the arm. We can only pardon De la Motte for having resorted to version in a case where the arm, swelled and wedged in the pelvis, presented in front of the head, from the fact that the forceps was unknown in his day.

B. In case *the hands* should present at the same time with *the feet*, they doubtless would not long maintain their position; the contractions of the womb would soon force them to rise, by urging the breech down. Besides, in order to obviate all cause of alarm, it would be merely necessary not to confound them with the lower extremities, and to pull upon the latter until the hips had come down. M. Caffort has, however, communicated to me a case, in which the feet, the hands, and the head presented together, and escaped together.

C. *To bring down the other Arm*.—Péan and Deleurye have advised, where an arm and shoulder fill up the orifice too exactly to allow the hand to reach the child's feet, that we should begin by bringing down the other arm, so as to enable us to penetrate more easily into the womb. This precept has been the object of much criticism. It has been said that two arms must necessarily occupy more space than a single one; that, by bringing a second one alongside of the first, instead of overcoming the obstacles, we should only increase them; and that, if the hand may be carried up as far as the arm that has not yet escaped, there is no reason why it could not reach the feet themselves.

I have had no occasion to repeat the practice of Deleurye in this respect; nevertheless, it seems to me to have been proscribed previously to being sufficiently examined. Baudelocque is, assuredly, deceived, when he maintains that it is always as easy to reach the feet as the arm that is still retained above the orifice of the womb; the arm may be near enough to be seized with two or three fingers, whilst the feet always require the whole hand to be introduced, and most commonly to a great depth. By pulling upon the second arm, we tend to make the engaged shoulder mount upwards, and to convert a position of the lateral surface into one of the sternal surface, or dorsal surface; and I can conceive that in some cases there would result an increased facility of passing the hand and of performing the remainder of the manœuvre.

We may produce, by pulling on the arm, what Denman wished to obtain by placing the thumb and index finger in the axilla in the form of a crutch. For

the same reason, it would be well to imitate M. Cosgrave in causing a part of the arm to return into the womb, by applying the thumb against the posterior part of the shoulder between the pains, and in keeping it above the pubis. The uterus will accomplish the rest, and version will not be necessary, as the author says, who assures us that he always acts thus with success. Without placing so much confidence in it, I think that it is a resource which should not be neglected.

In case of failure, and before resorting to pedotomy, relaxing remedies, opium, injecting of water or a solution of extract of belladonna into the womb, and even bleeding, although, with Baudelocque and M. Proctor, I do not think it here of great efficacy, should be again put in practice, unless the symptoms are truly grave. Dr. Davis, who insists, also, in certain cases of presentation of the arm, upon terminating the delivery by means of embryotomy; Douglass and Sims, who maintain the same opinion; and even Dr. Lee, who, to spare the mother, *separates the arm from the body, perforates the thorax, fixes a crotchet upon the pelvis or inferior part of the foetal spine, and by means of sufficient force thus extracts the child*, do not appear to me to have formed a correct idea of the course to be pursued in such cases.

As long as the accoucheur is not in possession of certain proof of the child's death, he has no right, under any pretext, to mutilate it; and, if ever the presence of the arm could really prevent the intromission of the physician's hand, it would be far better to follow the advice of Bodin, and perform the vaginal Caesarian operation, than to have recourse to embryotomy. Even although the child be dead, we should proceed in the same manner; and, in the first place, put in requisition blood-letting, the bath, injections, ointments, and indeed all sorts of relaxing and sedative measures.

ART. XII.—GENERAL RECAPITULATION ON VERSION.

In the manœuvre,

1st. *All the positions of the head may be reduced to two.*

2d. *All the positions of the side* belong to the second stage of the manœuvre for the head positions.

3d. *All the positions of the back* and of the *sternum* should be reduced to shoulder positions.

4th. *All positions of the shoulder* are at first converted into positions of the feet.

5th. In turning, therefore, there are, in fact, but two positions which it is essential to study profoundly, and consequently but two manœuvres which it is indispensable to know well.

6th. As these two manœuvres differ only in requiring the employment of a different hand; as in reality the right hand does not manœuvre differently from the left, it follows that the whole manœuvre in labors is reduced to the rules which were laid down in speaking of version by the feet in positions of the vertex.

I am aware that, as thus proposed, the question will not always be exactly understood; but I also doubt whether those to whom these general rules will not suffice, will be able to make much out of the most elaborate explanations. In the detailed applications, there is an infinity of shades which words cannot describe, but which are easily guessed at by an intelligent man, or which practice alone may teach him to discriminate.

In taking all the precautions which I have pointed out, we should not prefer version by the feet to the application of the forceps, as Denman seems to think, but we should render the delivery as little dangerous as possible. In fine, if it is true that traction sufficiently strong to cause a depression of an inch in the parietal bone can deliver a living child, as Denman says that he has seen in the case of a woman who had had before eight dead children, M. Pezerat, who speaks

of a similar depression in a vertex presentation and of another in a case of version, does not appear to have been so fortunate. I have myself met with an example of such depressions after very difficult version, but the fœtus was dead.

SECT. II.—OF THE FORCEPS AND LEVER.

ART. I.—THE FORCEPS IN ITSELF CONSIDERED.

The forceps is an instrument with which the child, while still within the organs of the mother, is seized and drawn forth.

§ 1. HISTORY.

It is not very precisely known who was the first inventor of this sort of pincers, nor at what period it was first made mention of. It is true that, in the time of Avicenna, certain blades with teeth in them were made use of for the extraction of the dead fœtus. *Leget foetum cum margine panni*, says this author, *et trahat eum, quod si illud non confert administrantur forcipes et extrahitur cum eis*. Albucasis speaks of a kind of pincers with wolf's teeth. Rueff also speaks of pincers he made use of to extract the separate bones of the cranium. But what comparison is there between these clumsy instruments, which no one would have ventured to apply to a living child, and the forceps employed at the present day?

The Chamberlains were for a long time in possession of a secret for terminating difficult labors. One of the members of that family came to Paris for the purpose of convincing the French of the value of his instrument; but, as he was not successful in his first attempts, and was ill satisfied with his reception in France, he returned with his secret to London. Chapman and Giffard, who pretend to have been acquainted with the means employed by Chamberlain, published a description of it at the commencement of the eighteenth century, and asserted that it consisted of a forceps for taking hold of the head. Mr. Burns says that Butler first gave a description of it, and that Chapman did not divulge the secret until the second edition of his work. The instrument Dussé speaks of is also a kind of pincers. A surgeon of Brentford, whose name was Drinkwater, is also spoken of as the author of a similar forceps; but it is really impossible to determine whether the Chamberlains made use of a forceps or a lever, or some other instrument, or whether the *hands*, which Palfin says he first thought of, and the invention of which was claimed by Ledoux, were anything else than the instrument used in England. The pincers with two blades, described by Mesnard in 1741, and with which he thought he could terminate a great many preternatural labors, was also one of the first forceps invented in France.

However this may be, it was about this time that the use of the forceps was introduced into the practice of midwifery. At first, formed of two blades, either full or fenestrated, which were introduced separately into the pelvis, and which were but slightly curved, they soon received the addition of a double notch, to admit of their being crossed. Smellie made them an extremely simple instrument, the application of which is as easy as possible; this accoucheur even thought it would be well to have two forceps, one very short, to be applied to the head when already down in the excavation, and the other rather longer, having a concave edge, for the purpose of penetrating as far as the superior strait.

Levret, on his part, introduced such important modifications of the forceps, that he in some sort made a new instrument of it, which is still known in the science as *Levret's forceps*. Like all the others, this forceps is composed of two branches: one called the *male* branch, which I prefer to call the *left* branch, and the other the *female* branch, which I shall call the *right* branch; the blade of each is largely fenestrated, has a bead or blunt crest on the circumference of its

concave surface, and on one of its edges exhibits a curve which corresponds with the curve of the axis of the pelvis. The handles, which are entirely metallic, and not quite so long as the blades, terminate by a flattened hook. At the place where they cross there is a flat surface, a pivot and a mortise, which admit of their being firmly united, and prevent them from sliding on each other when they are once applied.

Since the time of Levret and Smellie, the forceps has undergone numerous changes. Without speaking of those of Røederer, Crantz, Walbaum, Johnson, Fried, Stein, Leake, Plenck, Osborn, Rowlinson, Bland, Burton, and an infinity of others, the figures of which may be seen in the treatise of Mulder, we have the jointed forceps of Saxtorph, which in other respects very closely resembles Smellie's instrument; that of Coutouly, also jointed, but at the same time much more complex than the former, and which admits of various shaped blades being fixed to the same handle, according to circumstances; another one, by the same accoucheur, for the handle of which there is substituted a transverse metallic hilt, and, in consequence of the manner in which the branches are united, must act like a lever of the third kind: that of Baudelocque, or Péan, which differs from Levret's only in being rather longer; the forceps of Thenance, the branches of which need not be crossed, and which unite near to the curved end of the handle, and is thus converted into a lever of the third kind, like one of those of Coutouly; the two forceps of M. Dubois; that of Brulatour, jointed by a peculiar mechanism; that of Bruninghausen, the pivot of which is replaced by a sort of round-headed nail, and with very small fenestres in the blades; then the forceps of Meyrieu, which is also jointed; then that of Doctor Guillon, also jointed, and which has no need of a movable pivot in order to be united, and contains in its handle a pelvi-cephalometer, blunt hooks, sharp crotches, a perforator, and an extractor. Lastly, MM. Capuron, Maygrier, Flamant, Colombat, and Prout have also thought proper to propose some modifications in the construction of the forceps, so that the profession is now in possession of near a hundred species. The dissertations of MM. Reis, Flamant, and Rist, together with that of Mulder, moreover, will give the reader every desirable information on this subject.

§ 2. APPRECIATION.

There is not, strictly speaking, one of these forceps with which the principal object proposed, viz., the extraction of the fœtus, cannot be attained; but, at the same time, not one of them presents more real advantages united than Levret's. Its inventor, who applied it so often; Baudelocque, whose practice was so extensive; Mesdames Lachapelle and Boivin, who must have assisted the delivery of so many women; MM. Désormeaux, Gardien, Evrat, &c., never felt the necessity for modifying Levret's forceps, and M. Dubois has long since rejected in his own practice several alterations in them introduced by himself.

It is well to remark, besides, that most of these pretended improvements have been proposed only by young men, who had had no opportunity of convincing themselves that in this, as in all other surgical operations, much less reliance is to be placed upon the form of the instrument than upon the address or skill of the operator.

Forceps of the Author.—The Levret forceps, made somewhat larger according to the views of Péan, deprived of the bead upon its concave surface, and file-polished, in the way directed by Professor Flamant, terminating in blunt hooks, containing a *pique*, as recommended by M. Dubois, without any shoulder near the joint, and without a sliding plate to secure the pivot, is the one I prefer. A correction that I would willingly adopt, provided it could be effected without weakening the instrument, would consist in having hinged joints, so as to permit them to be doubled up, and thus rendered more portable; but up to the present time this has been attempted in vain, and an examination of the forceps lately

made by M. Colombat leads me to think that that ingenious surgeon will not be more fortunate in this respect than his predecessors.*

The *forceps of M. Audibert* does not differ from others, except that there is engraved on its branches rules for its application. In this respect, it is an instrument which we can recommend. That of Siebold being open at the side, as that of M. Guillon, seems to possess a more easy lock than ours. It offers also a curve which I have fully adopted.

M. Radford, who lays down the rule that the blades should be always applied at the side, has designed a forceps which resembles no others. The two branches are curved at the edge, like those of Levret, and lock after the manner of Smellie's small forceps, but the blades are very long, and one of them, that which should be applied to the face, is straight, while the other, or that which should be applied to the occiput, is no more concave than the ordinary forceps. Without denying the utility of this instrument in particular cases, I will say, however, that of Levret should be preferred to it, and that it does not appear to me, as it does to him, susceptible of superseding all others.

§ 3. OF THE USE OF THE FORCEPS.

The cases that require the employment of the forceps are numerous, and may be divided into two classes: in the one, no other means than the forceps can be had recourse to: in the other, it would, strictly speaking, be possible to have recourse to turning, or to rely upon some other means of succor, should it be desirable to avoid applying the forceps. Antecedently to the invention of this instrument, all those labors that could not be terminated by the hand alone were treated by embryotomy, or by some serious operation upon the mother; at present, we are rarely reduced to the necessity of thus sacrificing the child, and of equally compromising the safety of the mother, because the forceps generally suffices to obviate this destructive practice.

It has been laid down as a general rule that the forceps must be applied, 1. Whenever the head is too large, either relatively or absolutely, to pass through the passages without exposing the woman to the hazard of exhaustion, or other dangers; 2. When the womb is in a state of inertia, and efforts to restore its contractility prove to be in vain, and the head is found to be so far engaged that it is impossible to restore it to the superior strait; 3. When any accident renders the extraction of the fœtus indispensable, and the head has already descended into the excavation.

A. Too large a Head.—If, as is already proved by the experiments of Baudelocque, Flamant, and some other authors, the head of a new-born child, when squeezed so as to bend a forceps of the best construction, is reduced in diameter not more than three or four lines at the utmost, it is evident that, when taken hold of within the pelvis, where it is already more or less compressed in various directions, it would not be prudent to depend upon any greater degree of reduction; and, besides, to obtain a reduction to that amount, it would be necessary for the instrument to be applied exactly to the two extremes of the bi-parietal diameter. But when we come to reflect upon the difficulty of fixing the blades exactly upon the points desired, and that each of them is a line and a half in thickness, it is difficult to believe that a head too large to pass through the pelvis,

* I cannot omit this opportunity of saying that I consider the obstetric forceps of Dr. Davis, of the London University, as the most convenient and safe instrument that has as yet been constructed. Its fenestra is so large that a considerable part of the parietal region is prominent through it; its new curve is so admirable that it is scarcely practicable to injure the anterior sacral nerves or other tissues with it; and its length is also well adapted for delivering from above the superior strait. Its lightness, not inconsistent with all needful strength, is a high merit in this excellent instrument. I satisfactorily employ it in preference to the Baudelocque forceps, or that of Siebold, which are so generally approved of in our country.—M.

P L A T E X.

APPLICATION OF THE FORCEPS.

FIG. I.—THE HEAD CROSSWISE, SEIZED IN THE DIRECTION OF ITS ANTERO-POSTERIOR DIAMETER AT THE SUPERIOR STRAIT.

FIG. II.—OCCIPITO-ANTERIOR POSITION AT THE INFERIOR STRAIT.

FIG. III.—APPLICATION OF THE FORCEPS AFTER DELIVERY OF THE BODY IN PELVIC PRESENTATIONS.

Fig. 1.

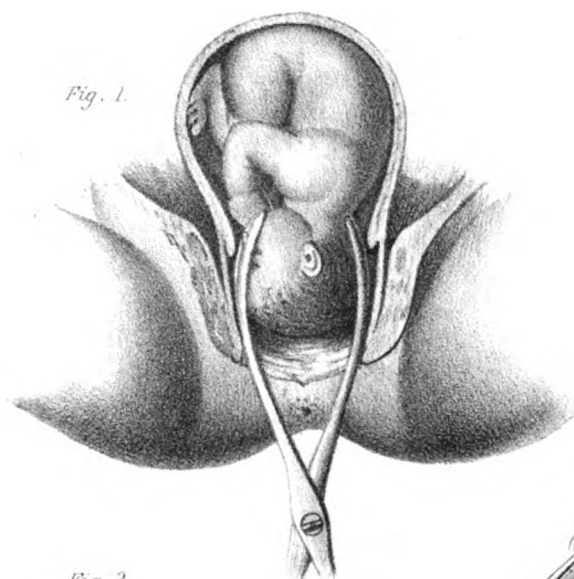


Fig. 2.

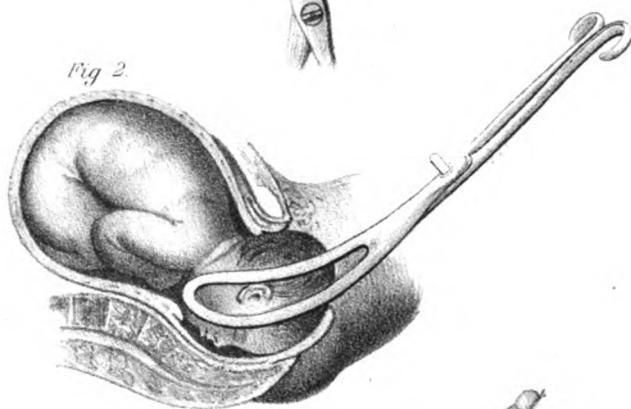
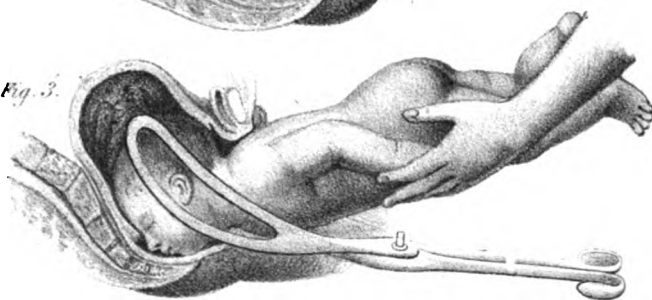


Fig. 3.



under the influence of the powerful contractions of the womb and the well-directed efforts of the woman, could derive any great assistance from the application of the forceps. I think, however, that in this respect Baudelocque goes too far, and that his pupils have laid down a false rule in saying, as P. Dubois does, that we should never have recourse to the forceps to reduce the size of the child's head. Siebold maintains, indeed, that he has seen a reduction of six lines obtained with the forceps of Levret. Thourct states the same thing, and I have succeeded myself on two occasions in effecting a reduction of from five to six lines, with forceps which were not very strong. Oslander says that he gained almost an inch. Moreover, while passing through the straits, the efforts of nature and the woman often join those of the forceps to flatten out the head, and no one can deny that the tractions of the accoucheur are a powerful auxiliary to the contractions of the womb and abdominal muscles. I delivered a young woman, Rue des Vieilles-Tuileries, with the forceps, in the presence of M. Morisse, by making powerful traction, and in such a way as to reduce considerably the size of the head. In a second labor of this woman, the child presented by the pelvis, and, although small; the head could not pass the superior strait without experiencing a depression of at least eight lines on the right parietal bone. I delivered the same woman a third time, in Rue Saint Victor, with the forceps, in the presence of M. Hourman. The same efforts were necessary, but no depression of the cranium was induced. Thus the forceps are a powerful adjuvant to the natural efforts, and their employment permits us to count on a considerable reduction in the size of the head.

B. Weakness of the Organism.—Inertia, or want of contractions of the womb, is one of the cases in which the forceps is most frequently applied. When the head passes with difficulty through the straits, and the woman is exhausted with vain efforts, the efficacy of this instrument is not contested by any one; but this is not the case where there is inertia only, without any narrowness of the passages. Here everything should be tried with a view of restoring the action of the womb, and the forceps ought not to be made use of until after the ergot has been given in suitable doses.

C. Accidents.—When the child presents by the vertex or by the face, and one of the complications pointed out in another article renders it necessary to deliver the woman without delay, one of the two following conditions will necessarily exist: 1. The membranes have been ruptured and the waters discharged for a long time; the womb is strongly applied to the fetus, and the head has reached the excavation, or it is at least pretty firmly engaged in the superior strait, in which case nothing can supply the place of the forceps; 2. The os uteri is dilated, the head is engaging, the membranes are ruptured: strictly, the forceps might be applied; but the child is still sufficiently movable to admit of our going in search of its feet. In this case, practitioners are not agreed as to the best mode of proceeding; some think, with Levret, Smellie, Plenck, and especially with M. Flamant, that the forceps promises greater advantages than turning; others, along with Madame Lachapelle, M. Désormeaux, and almost all the modern practitioners, are of a contrary opinion. I think there are error and reason on both sides. M. Flamant speaks the truth when he maintains that the forceps is much less dangerous for the fetus than turning by the feet, and that it is to be preferred in all cases where too much difficulty does not arise in its application; but he relies too much upon his personal address, and certainly inculcates a dangerous principle when he affirms that turning and delivering the child by the feet is almost never necessary; and that, however movable and high up above the abdominal strait the head may be, the forceps is always to be preferred.

Every accoucheur knows that, if the head is still movable, it will displace itself during the introduction of each branch of the forceps, and most generally is difficult to get hold of; that, as the blades of the instrument cannot, in reaching it,

be accompanied by the fingers, unless, as in M. Flaman's practice, the whole hand is introduced into the pelvis, they are in some measure introduced at hazard into the uterine cavity; that it is most generally impossible to say, exactly, whether they embrace the occipito-frontal diameter rather than any other; finally, that the woman is exposed to a thousand dangers, whereas the feet may be brought down with far less difficulty, and at a much smaller risk of accidents; but it is also undeniable, and it appears to be too much overlooked at the present day, that, although the woman runs incomparably less risk in turning, the same is not true as to the child, which too frequently becomes the victim of this manœuvre, while it scarcely suffers at all under the methodical application of the forceps.

It is therefore wisest to pursue a just medium betwixt these two extremes; to prefer the forceps, when we are much accustomed to handle them, when they can be applied without too much difficulty, and without any fear of injuring the woman: on the contrary, to have recourse to the hand to draw down the feet, under the opposite circumstances, that is to say, when the head is too high up, or too movable to be easily got hold of, and where there is nothing to prevent the artificial evolution of the fœtus.

§ 4. THE PARTS OF THE FŒTUS ON WHICH THE FORCEPS SHOULD BE APPLIED.

The forceps should only be applied to the head of the fœtus.—Smellie and others were wrong to advise its application upon the foetal pelvis; for, should even a small amount of force be employed, it would crush the bones of the hips; the upper ends of the blades would contuse or lacerate the abdominal viscera, and inevitably kill the child; besides, the blunt hook or fingers would always advantageously supply its place here; the head is the only part upon which it can act or be placed without inconvenience, and for which it was constructed.

From Levret and Smellie down to the most modern accoucheurs, the French and English authors have all recommended that the forceps should be applied so that its two blades should cover the two extremes of the bi-parietal diameter; that its long axis should be parallel to the occipito-mental diameter, and its concave edges turned towards the occiput, excepting always those cases where the head is delivered in an occipito-posterior position. It is true that Deleurye and Baudelocque had admitted that, where the head is locked transversely at the superior strait, it might at first be grasped by the occiput and forehead, so as to make it descend into the excavation, to be afterwards laid hold of in a more advantageous manner; but, as far as I know, nobody has followed this advice, especially as the case supposed by Baudelocque has, perhaps, seldom occurred.

German Method.—The practitioners of Germany, Prussia, and Russia follow quite a different rule; Saxtorph, Stein, and Weidemann, for example, pay no attention to the position of the head, but are alone governed by the pelvis. According to them, it is enough that the concave edge of the forceps should look forwards, and that the convex surface of the blades should correspond to the iliac fossa in order that they may be well placed. Reisenger and Kluge profess the same doctrine. They pay no regard to the position of the head; the pelvis alone guides them. According to them, if the convex edges of the blades look towards the iliac fossæ, they are well placed; the reason they assign is that we can very rarely beforehand determine what is the exact situation of the occiput; that, even supposing we could ascertain it, it would not on that account be necessary to change the mode of application of the instrument, inasmuch as, in the diagonal positions, the mere power exerted in fixing and uniting the blades brings the forehead in front of the sacrum or behind the pubis; that completely transverse positions are exceedingly rare, and would render the application

of the forceps too difficult, if the design of embracing the parietal protuberances were obstinately persisted in; lastly, that by conforming to their doctrine the operation is always extremely simple, and that the head almost always ends by placing itself, if it were not so already, in an antero-posterior position, so that, after all, the same result is obtained as by conforming to the principles generally adopted among us.

Without denying that there may be somewhat of truth in this view of the subject, which, it seems to me, has not been sufficiently attended to by the French, it may, nevertheless, be objected that, as a general proposition, it will always be better to pass the blades of the forceps immediately upon the temporo-parietal regions of the head than always to introduce them along the sides of the pelvic cavity; that, if it is rare to find the head situated directly across the pelvis, it is at least common to find it turned towards one of the acetabula, or sacro-iliac symphyses; that it is not only good, under such circumstances, to have the forceps turned somewhat to the right or left, but also that it most commonly assumes that direction spontaneously; and, so to speak, in spite of the operator, provided the head be pretty firmly fixed in the passage. Let us observe, further, that, by grasping the two ends of the occipito-frontal diameter, the head is prevented from flexing, it is forced to descend transversely, to present one of its longest diameters to the different passages, and that, if taken hold of in this situation, it cannot pass through the inferior strait.

Opinion of the Author.—To conclude, inasmuch as the occipito-bregmatic and occipito-frontal diameters always turn more or less directly from front to rear when they reach the excavation; as, in cases where the head has not yet cleared the superior strait, the occiput or forehead almost always looks towards one of the cotyloid cavities; as the claws of the forceps, after their introduction, naturally incline towards the sides of the head, or when it opposes but little resistance to the force exerted upon it, cause it to turn on its vertical axis, it may be said that the difference between our practice and that of the Germans is greater in appearance than in reality, and that, in fact, it does not appear that it can ever be indispensably necessary to place one of the branches of the instrument in front and the other behind. I will say, moreover, with Burns, who also adopts this practice, that, in applying the forceps over the face and occiput, the thickness of the blades of the instrument is no obstacle to its employment. It is, besides, altogether useless to cover one of the blades for the protection of the face, as Davis directs.

The positions of the face, particularly, require this method, even in the excavation, where they remain for a long time transverse. Thus grasped, the head is more firmly fixed than when embraced over the parietal bones, especially if we use the forceps of Radford, with the blades of unequal length and curve. An inclination of the occipito-frontal diameter is produced by the traction. The occiput approaches the lock, while the forehead glides towards one of the *fenêtres* of the forceps, and the head soon becomes embraced by the nucha and bregma. The inferior strait and even the vulva will allow it to pass easily in this way, supposing that it cannot be brought down in the direction, or in the coccy-pubic, or at any rate in the oblique diameter.

Above the Superior Strait.—It was for a long time thought that the forceps should not be carried above the superior strait. Its want of curvature shows that it was at first only intended for the excavation. Smellie first gave the curve to his forceps, so that he might seize the head after the delivery of the body. Röederer and Barbaut were the first to propose its introduction into the womb. Deleurye, who praises it highly, says that he has frequently employed this practice. Coutouly praises it more than any one else, and seems to have followed it with most success. Flamant has contributed more than any other person to familiarize practitioners with the doctrine of Barbaut. I am

astonished that it should be opposed at the present time by so many distinguished authors. I believe that most practitioners practice it without any hesitation. Indeed, almost always, the great diameters of the head are above the superior strait, at the moment when the swollen integuments project into the excavation. It is then that the forceps is most frequently used. It is rare, on the other hand, for the head not to be firmly engaged in the strait, when the use of the forceps is thought of; for we do not determine on their application until after the rupture of the membranes, and when the insufficiency of the uterine contractions is well established. There should then be no dispute on this subject. For my part, I do not hesitate to carry the forceps to the superior strait, and even above it. I have done so a dozen times, and always with advantage.

Thus the forceps may be applied to the head when the vertex or the face comes first, and even when the trunk escapes before the head; whether above the superior strait, whether in the excavation, whether over the bi-parietal diameter, or whether over the occipito-bregmatic.

To render this application indispensable, it is necessary: 1. That the head shall not require to be reduced more than two or three lines, or that it shall be possible to displace it, and direct it more advantageously through the straits; 2. That there shall be a pressing need for terminating the labor without delay, or that no further reliance can be placed on the powers of the woman in the expulsion of the child; 3. That the head shall be engaged so far that it would be impossible without difficulty to return it and proceed in search of the feet; 4. That the membranes shall have been ruptured, and the os uteri completely dilated for a greater or less period of time.

§ 5. MANIPULATION.

Previously to commencing the operation, the same precautions should be taken as for turning. The woman should be situated in the same manner. However, there may be circumstances in which the accoucheur need not alter her position; for example, in case of convulsions, hemorrhage, or extreme debility, indeed any circumstances which would render any shock or movement dangerous; but then the head must have cleared the abdominal strait, in which case a short forceps may be made use of, such as Smellie's, for example.

The posture on the side adopted by the English for spontaneous delivery, is also preferred by them as most favorable for the application of the forceps, which I can hardly conceive of. Mesnard, Ficker, and Champion praise this plan in some exceptional cases, and prefer, with reason, I think, that the woman should be placed on the edge of the bed. Deleurye fixes the woman on her elbows, and operates from behind in cases where the occiput looks towards the hollow of the sacrum. Champion says that it is then more easy to carry up the instrument, and to draw in the axis of the superior strait. This may do for exceptional cases; but the rule is that the woman should be placed on her back, just as for version.

As it is wrong to introduce the forceps into a woman's organs, without advertising her of it, I think the best mode of quieting and re-assuring her is to show her the mechanism of the instrument.

There should be in readiness some warm water to attemper the instrument; and some butter, oil, or mucilage, to make it slip more easily over the surfaces. When everything is properly disposed of, and the position of the head has been ascertained, nothing remains but to introduce the blades; but, as there is some difference in this manœuvre, according as the occiput is directed in this or that manner, as the head descends before or after the trunk, I shall now proceed to examine these different cases.

A. Occipito-Anterior Position.—This position, the most advantageous, and most frequent of all, requires that the left branch should be introduced first.

1. *Introduction.*—Two or three fingers of the right hand, in a flattened position, are to be passed up betwixt the left side of the vagina and the parietal protuberance, so that their extremities may touch the os uteri.

Fig. 21.

a. *Left branch.*—The instrument is then taken by the left hand, as a writing pen is held, and the handle is first raised up high in front of the woman's right groin, so as to bring the other extremity in the line of the axis of the vulva or inferior strait: as for the introduction of the hand, the interval between two pains must be chosen; it is introduced gently, without force; in proportion as it enters, the handle is by degrees brought from above downwards and from right to left, towards the median line; after this it is frequently necessary to place the thumb above and to the right of the pivot, instead of leaving it beneath it; it is thus moved onwards, making it follow the left posterior inclined plane or front of the sacro-iliac symphysis, rather than the left side of the pelvis properly so called, until its *entablement* shall have arrived between the labia; after which the handle is brought near the internal surface of the left thigh, depressing it more or less according to the depth to which the blade has been carried.



Introduction of the first blade.

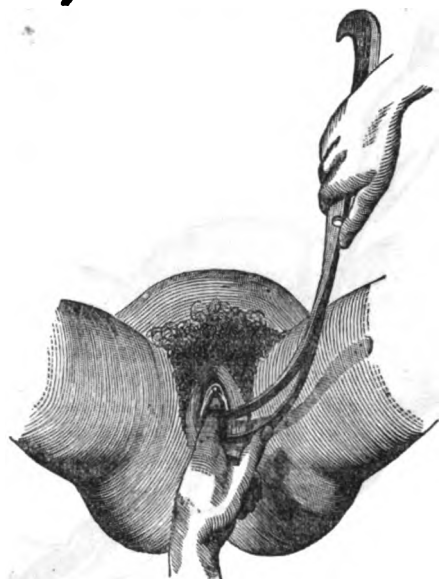
During this introduction, the point of the clam, held very strictly betwixt the head of the foetus and the parts of the woman, ought never to deviate from the curve of the excavation. By deviating from the axis of that cavity, it would be arrested by the vagina, which it turns up in folds, or might lacerate; if inclined too much in front or to the rear, it would involve the bladder or rectum in the danger of being wounded. On the other hand, by turning too much inwards, which almost always happens in using a forceps with a very concave blade, it abuts against the child's head, and is soon stopped by the folding up of the scalp; so that in any way it would be dangerous to introduce it by force.

Whenever, therefore, any resistance is experienced that does not appear to be natural, instead of pushing it on with too much violence, the instrument should be withdrawn a little ways so as to disengage it, and afterwards slip it up in a more favorable direction.

Where the head has passed through the os uteri, as long as the forceps does not abandon the fingers that are in the vagina, one must be very awkward to go amiss; but this is not the case where the head is almost inaccessible, and where the circle of the orifice still envelops it in the shape of a crown fitting more or less tightly. The greatest attention is necessary here; if the end of the clam deviates from the cranium, it slides over the outer surface of the os uteri, and gets into the cul-de-sac, or circular groove formed by the vagina, where it is attached to the neck of the uterus. If the accoucheur should not perceive this deviation, it is easy, without pointing them out, to comprehend the havoc and

danger that might ensue. However, in order to avoid them, it suffices never

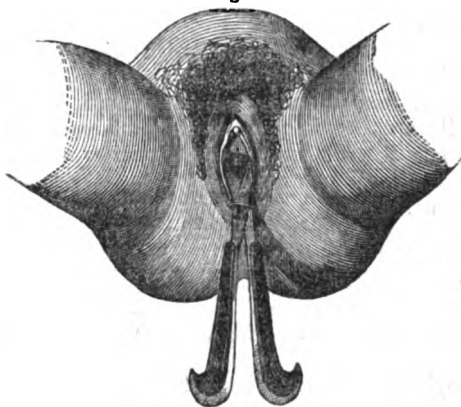
Fig. 22.



Introduction of the second blade.

2. *Locking*.—In order to be able to unite the two branches of the forceps, they must both be at the same depth in the pelvis; the mortise in one must

Fig. 23.



The forceps applied and locked.

correspond exactly to the pivot in the other; their place of crossing must not be more to the right than to the left, and their handles must be sufficiently depressed. When the occiput is behind the symphysis pubis, it is sometimes difficult to fix them exactly upon the sides of the pelvis; they incline towards each other at their convex edges, while their concave edges tend to separate, which doubtless depends upon the head being not so thick towards the forehead as towards the occiput. This difficulty may be overcome by taking a firm hold of the blunt hooks of the forceps, so as to use them as a bent lever of the third kind, but we should be very sure that the obstacle depends upon no other cause. By following this precept, the concavity of the blades comes to be applied over the parietal protuberances when the occipito-frontal diameter is in line with the sacro-pubic, and, in the oblique positions, the vertex is displaced, and promptly directs itself to the top of the arch of the pubis.

Further, it is evident that, when the head is too firmly fixed, one of the

to make the instrument penetrate beyond the parietal protuberances without being previously assured of the position and state of the os uteri.

b. Right branch.—When we are sure that the left branch is well placed, an assistant takes hold of it and keeps it in contact with the thigh while the physician introduces the other.

This one is to be taken in the right hand, and, guided by the fingers of the left, to the right side of the pelvis, or corresponding sacro-iliac symphysis; to make it enter, we are to act exactly as was just now directed in speaking of the left branch. If the occiput is inclined to the left, we endeavor to move the blade forwards behind the right thyroid foramen. If it be a right occipito-acetabular position, on the contrary, we leave it in front of the sacro-iliac symphysis, while we endeavor to get the left branch behind the left acetabulum.

When the occiput is behind the symphysis pubis, it is sometimes difficult to fix them exactly upon the sides of the pelvis; they incline towards each other at their convex edges, while their concave edges tend to separate, which doubtless depends upon the head being not so thick towards the forehead as towards the occiput. This difficulty may be overcome by taking a firm hold of the blunt hooks of the forceps, so as to

branches of the forceps will, under efforts of this kind, resist less than the other, and place itself under the corresponding anterior inclined plane of the pelvis; so that the three occipito-anterior positions, so far, do not sensibly differ from each other as regards the application of the instrument. The hand generally suffices to turn the pivot, otherwise the kind of lever called the *key of the forceps* is had recourse to.

In the next place, we ascertain that the head is the only part embraced by the blades, and that the os uteri, the womb, or some other part of the woman, is not taken hold of; the mode of acquiring a degree of certainty upon this point consists in moving the instrument gently from *handle to handle*, in the direction of the axis of the pelvis. If it moves readily, and without making the woman suppose that she is getting *torn* or *pinched*, there is nothing to fear; in the contrary case, it is almost certain that some fold of the genital organs has got pinched in the clams of the instrument, and until the head shall have been more properly embraced, all pulling and every species of pressure should be carefully avoided.

In operating with a view to lessen the size of the head, a loop of ribbon, of thread, or of a fillet is fixed on one of the blunt hooks of the forceps; a turn is then made over the other branch, and the handles are brought as near together as is deemed necessary; the fillet is then carried over the first handle, then brought back over the second, and so in the form of a figure 8 until it is all used; it being well understood that the pressure exerted must be greater or less, according to the degree of reduction which it is desirable to obtain.

Where the passage is capacious, and the forceps is only had recourse to for the purpose of speedily delivering the woman, this compressing method may indeed be dispensed with. It is then alone that M. Kilian, who is in favor of tying the handles of the forceps, as Boer and Carus also recommend, is correct; nevertheless, as it is always well to have both hands disposable, so as to be able to rest them from time to time, it seems to me better to apply the fillet as recommended in all cases, with this difference, that, under the circumstances now supposed, it is employed solely for the purpose of keeping the branches of the forceps in a fixed and properly approximated situation.

3. *Extraction.*—After having wrapped the handles in a napkin, the right hand is placed near the blunt hooks, *above* as long as it is necessary to pull in the axes of the superior strait, and *below*, on the contrary, when the head is at the inferior strait; the left hand is applied at the roots of the blades, beyond the pivot, below when the right hand is above, and above when it is underneath.

The forceps being properly held, and the head firmly grasped, before we begin to pull downwards the occiput must be directed diagonally, provided it be still at the superior strait; if it be in the excavation, it is brought behind the symphysis pubis. To compel it to descend to the centre of the pelvis, and to prevent the forehead from descending prematurely, it has been recommended to sustain the latter with a couple of fingers of the left hand; but I think it would be wrong to place much dependence upon this precaution, which, besides, deprives the accoucheur of a great portion of his power.

Fig. 24.



Forceps applied in the mento-posterior position of the face.

I prefer trusting to the depression of the handles, to such an extent as to keep the blades in the axis of the superior strait, and to tractions performed in the same direction.

If the *head is locked*, or too firmly fixed at the superior strait, we first attempt to start it as we start a cork in a bottle or a nail that we want to draw: it is then to be pushed up so as to oblige the occiput to descend in a more favorable manner. We are to pull obliquely downwards and backwards until the strait is completely cleared. As soon as the rotatory movement is effected, and the head is in a direct antero-posterior position, we ought, in pulling, to move the handles of the forceps alternately right and left, until the parietal protuberances have passed the ischiatic strait. These tractions ought to be at once powerful, slow, and moderate. Should there be no reason for haste, we need not pull except during the uterine contractions, which, besides, rarely fail to become very energetic and frequent, as soon as we commence the operation; but when the very moments are counted, or the womb in a state of inertia, it would be useless or dangerous to wait; we ought to act immediately.

When the *head reaches the vulva*, and is retained only by the soft parts, we leave off pulling from handle to handle. We ought not even to pull at all, provided the womb appears to have preserved a sufficient degree of energy to enable it to terminate the labor; for at this juncture it is highly important not to proceed too rapidly, and to be assured that the best way of managing the perineum is to retain the head as long as it may be at the vulva. Instead, then, of engaging the woman to bear down, and pulling at the same time with great force, as we had previously done, she is urged to be careful of making strong efforts; it is often best even to withdraw the instrument, which, if the head be born, requires no particular precaution, while, in the contrary case, the blades are removed one after the other, holding them in the same way as when they were introduced, and beginning with the right branch, which is uppermost. Should it be afterwards necessary to exert any tractive force, it might be effected by placing the fingers upon the temples or under the armpits of the fœtus, as is done in some cases of spontaneous delivery.

Authors have expressly advised that the noise made by the striking or rubbing of the two branches of the instrument together should be avoided, because, say they, this noise might frighten the woman. It would doubtless be imprudent to take no precaution on this head, and to clash the blades together as we would the foils at a fencing match; but I can perceive no reason for the minute precautions that are indicated in relation to the matter in the latest publication on midwifery.

If the occiput is turned posteriorly, the forceps ought to be introduced and fixed in the same manner as in the former position; only, it is unnecessary to depress the handles so much while drawing down. As the occiput, which, however, ought to emerge first, constantly tends to lodge against the anterior face of the sacrum and coccyx, which is very long and very concave, more numerous difficulties must be expected, as well as greater dangers to the perineum. But the operation would be still more dangerous and difficult, if, as has by some been advised, the concave edge of the instrument should be turned backwards instead of looking towards the pubis. In the first place, to conform to this precept, it would be necessary to change the posture of the woman; and then it would be impossible to grasp the head at the superior strait otherwise than in a line from the anterior fontanelle to the nucha; in the third place, as the forceps would no longer be parallel with the curve of the pelvis, its concave edge would, during the tractions, of necessity press the vagina and bladder with violence against the pubis, while the ends of the blades would operate in the same manner, and still more certainly upon the soft parts behind. If, on the other hand, the head should be grasped only with the view of turning the occiput round to the front of the pelvis, as it would be nearly impossible to act at the same time upon the trunk of the fœtus,

we should succeed only in wringing the child's neck. In this, as in the occipito-anterior position, the forceps ought, therefore, to be so placed that its concave edge may look forwards, even though it may be turned towards the child's forehead, and not towards the occiput, as the general rule would require.

B. *Occipito-Iliac Positions*.—1. *Left occipito-iliac position*.—It does not appear to me that such a position, in the excavation, is admissible; but should it ever be met with at the superior strait, and require the application of the forceps, I do not see how we could dispense with following the precept of the German accoucheurs, unless, indeed, we should imitate M. Flamant, and proceed beforehand to take hold of the head with the hand, and place it in a more convenient position; a proceeding much easier to recommend than to execute, in a majority of cases. The sacro-vertebral angle, the coccyx and the perineum, would not admit of the instrument being placed transversely; at least, it would be absolutely impossible to extract in the direction of the axis of the superior strait.

Admitting, however, that the case may occur, this is the advice given by the authors. The right branch of the forceps is to be introduced first, and conducted up with the ordinary precautions, in front of the right sacro-iliac symphysis, as high as the forehead; then place the ends of the first fingers of the left hand under its convex edge, and in concert with the right hand move it from behind forwards and from right to left, until its concave edge is turned towards the left iliac fossa, and the blade has arrived upon the right parietal protuberance. The handle, strongly depressed, is then given to an assistant, who holds it against the woman's left thigh.

The left branch is held in the left hand, and passed up along the posterior part of the pelvis until its point is above the superior strait, and the pivot even with the mortise that is in the other branch. After having joined them and dislodged the head, if it be still in the superior strait, and forced the occiput to descend into the excavation, provided it were not already there, the concave edges of the instrument are gradually brought to the front, and the remainder of the operation is conducted as in the occipito-pubic positions.

2. *Right occipito-iliac position*.—What I have just now said of the left occipito-iliac position is entirely applicable to the right occipito-iliac position; they only differ from each other in regard to the application of the forceps, in doing which the left branch is to be introduced first.

C. *Positions of the Pelvis*.—It may happen that, after the child has been drawn down by its pelvic extremity, great difficulty shall be experienced in attempting to disengage the head. The same thing may be met with at the close of a pelvic labor which, up to that moment, had exhibited nothing peculiar; if the fingers and hands do not suffice for the delivery of the woman, it will probably be found that it is occasioned by a contraction of the pelvis, more or less considerable, in which case the forceps may be of little avail. However, it must be tried, rather than resort to symphysectomy or the Cæsarian operation, particularly provided the head is below the superior strait. Whether Deleurye practiced it first, as he thinks, or whether the idea of it is derived from this *great master*, who confined himself to recommending it in his lectures, this operation may be, notwithstanding, of real assistance here.

If the occiput is in front or a little to one side, an assistant should raise the trunk upwards, and first the left branch, then the right is introduced, following the same rules as if the head had descended first.

If it is behind, and it be found impossible to turn it round to the front of the pelvis by means of the hands, the fœtus is to be turned back over the perineum, and the branches of the forceps are still to be introduced as before.* But in

* The woman should lie on her back, with the perineum projecting over the foot of the bed. If the body of the child be now supported in a vertical position by an assistant, it will

extracting the head we should endeavor to act with sufficient force upon the forehead and chin to make those parts descend early under the symphysis of the pubis.

Lastly, should it be found on one side, the trunk ought first to be moved to the right or to the left, and then we should proceed as has been directed for the corresponding positions of the vertex.

Thus, in all cases, the trunk is to be turned towards the direction in which the occiput looks, and the forceps introduced along the sides of the head in such a way that the concavity of its edges may be towards the front, or shall be brought there in the progress of the operation.

I will repeat, however, that, in the positions where the face looks forward, it will be best, unless the chin is already very much pushed down, to carry the body towards the *mons veneris*, to introduce the forceps behind, to place them over the parietal protuberances in the direction of the occipito-bregmatic diameter, and to exercise a see-saw motion with the head from before backwards, and from above downwards, as we have seen in the observations of Leroux and Eckardt, and as we may also remark in some of the cases which serve as the basis of the work of M. Michaelis.

It is easy to perceive that the presence of the trunk must add to the difficulties that are experienced in head presentations. Still, many practitioners have thought that, under such circumstances, the fingers might be beneficially substituted for the forceps, and that it is entirely useless to attempt its application where the head has not yet reached the excavation.

This seems to me to be a dangerous doctrine. I know very well that a skillful accoucheur will generally triumph over the difficulties presented by this position without having recourse to the forceps; I am also aware that the forceps, here, cannot easily be applied to the head at the superior strait; but it is also undeniable that the head may be arrested at the superior strait by such a degree of contraction that the best combined efforts of the hand shall be insufficient for its extraction; why, then, should not the forceps offer the same advantages in this case as in the positions of the vertex? Moreover, excepting symphyseotomy, what other means is there of extracting the foetus alive? I will add that, the trunk being without, and the head in some measure beyond the reach of the uterine contractions, any force exerted upon the body with the hand, and sufficient to enforce its passage through the organs, will generally act on the spine of the child to the extent of seriously compromising its existence, whereas the forceps does not expose it to the same dangers.

Consequently, we may have recourse to the forceps, in pelvic presentations, 1. When the head is stopped by the inferior strait only, and we are convinced that the powers of the hand alone would be insufficient, or too dangerous; 2. When the same part has not cleared the superior strait, but when it must be engaged in it, or at least the face must be chiefly in the excavation, and it must be possible to reach the os uteri with some of the fingers. It is well understood, moreover, that in both cases, the chin must have been previously forced to descend, the head must have executed its rotatory movement, and the shoulders must have been disengaged.

D. Double Foetuses.—In cases where two children are united to each other at their anterior or posterior surface, and where two large heads are supported by a single trunk, it is possible that the efforts both of the woman and the accoucheur, although properly combined, may be insufficient to effect the delivery without the aid of the forceps.

If the trunk or the two trunks have escaped, it will be necessary, in order to

be found that there will be space enough to introduce the forceps on each side of the face. I have, in general, found the application of the forceps quite as easy in a footling or pelvic case as in any vertex presentation.—M.

admit of the application of the instrument, that one of the heads shall be in the excavation; nor, provided the monstrous fœtus should present by the vertex, ought this instrument to be rejected, although neither of the two heads should have cleared the superior strait. In the former case, that is to say, where the trunk is delivered, the head nearest the posterior plane of the pelvis ought to come down first, and in the latter, on the contrary, that one which is naturally turned towards the pubis.

Finally, the operation, if conducted agreeably to the general rules indicated higher up, would require no other precaution than that of raising the handle of the forceps forcibly upwards at an early period, and to pull, almost from the commencement, in the line of the axis of the vulva. This would be the only way to avoid forcing the second head, still contained in the womb, to reverse itself, or to remain hitched, as it were, above the pubis or the sacro-vertebral angle.

E. *The Head, separated from the Body, remains alone in the Pelvis.*—Formerly so little care was taken in regard to the extractive force exerted upon the fœtus, when it was deemed necessary to deliver it footling, that it was not very uncommon to see the neck separate from the head and the trunk, being torn off during the violence of the exertions. At the present day, this accident could happen only to the most ignorant or thoughtless practitioner; for it is never allowable to employ a force with the hand alone, sufficient to produce the occurrence. It is only where one of the passages, of size sufficient to admit of the transit of the trunk, is so contracted as completely to arrest the head, that it might perhaps become useful to separate the portion of the child that is without from that which remains enclosed within the genital organs. (See *Presentation of the Arm.*)

But, admitting that this necessity does exist in some cases, it still must be very rare, since the delivery of the body does not absolutely prevent the application of the forceps to the head; nevertheless, as we unfortunately meet with a good many persons who undertake the practice of midwifery without possessing the least knowledge of the subject, it would be imprudent for the educated practitioner not to reflect upon what he would do if called to a woman whose fœtus had been thus decapitated, either voluntarily or involuntarily, by immoderate pulling or by means of an instrument.

In the first place, the head must be placed in a proper situation, that is to say, its occipito-mental diameter must be adapted to the axis of the pelvis, and the face turned backwards.

When in the excavation, it is almost as easy to get hold of it as if it were not separated from the body. At the superior strait, the operation is often found to be one of the utmost difficulty, and appears to be even impracticable, when the womb is scarcely contracted, and the face or occiput is not yet engaged. When the head is firmly fixed by the contraction of the uterus, or when it can be kept still with the hand so as not to slip out of the grasp of the instrument, we are to proceed just as if the body were still attached; only, in order to make surer of its not turning so as to put the occipito-frontal in place of the occipito-mental diameter during the process of extraction, we should endeavor to steady it by applying a couple of fingers of the hand that holds the neck of the forceps near the vulva, to the face or chin.

After decapitation, two obstacles may remain to the delivery of the head. These obstacles, which were well understood by M. Champion, are the quick contractions of the neck of the womb and contractions of the pelvic strait. In other words, the head may then be retained by the womb or by the pelvis, so that baths, opiates, relaxing measures, and even extraction of blood may often prove necessary before the application of the forceps.

F. Recapitulation on the Employment of the Forceps.—In bringing this article to a close, I think it a duty to repeat the following corollaries:—

1. The forceps ought never to be applied without an evident necessity, because, although it might not be mischievous to the child, the mother may receive the greatest injury from it.

2. In the practice of good accoucheurs, the forceps is scarcely employed once in two hundred labors;* and as everything tends to show that the ergot will be advantageously substituted for it in a multitude of cases, its employment will doubtless continue to be more and more rare. Most of those who make a more frequent use of it are not wrong merely because they perform an operation that is useless, but also, and especially because they needlessly derange the progress of a natural function; and because they voluntarily expose themselves to the risk of complicating the sequel of delivery, even admitting that they are sure of not wounding any organ.

3. The forceps cannot be beneficially applied, except to the head, either when it descends foremost, or when it follows the body.

4. It is much more to be relied on for the purpose of grasping, and extracting the head, than for diminishing its size.

5. It is not allowable to introduce it into the womb until the orifice is sufficiently dilated, and the head ceases to be movable and loose above the superior strait.

6. As far as possible, the blades of the forceps ought accurately to embrace the two sides of the head in the direction of the occipito-mental diameter; nevertheless, where some difficulty or doubt is experienced, it is more convenient and more prudent to pass them up along the sides of the pelvis.

7. Except in the right occipito-iliac position, if it ever does occur, and we should wish not to grasp the head by the occiput and forehead, the left branch must always be introduced first, because it is the undermost.

8. In whatever manner the branches are introduced, their concave edges must be ultimately brought in front; but if the head has been seized by the ends of its occipito-frontal diameter, and has not, while descending, rotated between the clams of the instrument, it must be abandoned at the inferior strait to be taken hold of more advantageously, should the forceps still continue to be necessary. There is nothing to prevent us from neglecting this precaution in many cases. When the head has been grasped in a transverse position of the face or vertex, the cranium acquires the same relation to the instrument, and there will be no great difficulty in extracting it obliquely or even directly crosswise.

9. The extraction should always be performed in the line of the axis; always with gentleness, never precipitately, nor by jerks; the tractions from handle to handle are of no use after the head occupies the vulva, and if performed while it is at the superior strait, would sometimes be dangerous.

10. It is not only because it has become useless that the instrument should be taken off, when the head, at the lower strait, is only resisted by the soft parts, but also, and chiefly, in the view of avoiding laceration of the perineum, and allowing the vulva to dilate more slowly and regularly.

11. From the time of Levret to that of Baudelocque, who in a manner restricted its use, the forceps was so often employed, that it became the source of great abuse. Thus we see Denman, the great partisan of version, maintaining that, in France, instruments are too often resorted to, and that in

* Dr. Collins, page 10, tells us that, during his mastership of the Dublin Lying-in Hospital, in 16,414 deliveries the forceps was used only 24 times, and the lever three times, making 27 cases in all, or one case in 608 deliveries. It is to me inconceivable that, viewing the class of the population which resorts to that institution, many more examples should not have occurred requiring the application of the instrument. Perhaps, had the forceps been less timidly resorted to, the ratio of cures or recoveries, already so honorable to that house, would have been still more creditable to it.—M.

this respect the English practice is much more rational. It is this alone, without doubt, which caused A. Leroy to declaim against the forceps, which he regards as a useless and dangerous instrument, and which caused him to avow fearlessly that "*le vrai forceps est la lancette!*" At the present time, the practice has changed, and it is in France that the forceps is least employed. In England, Clarke used it but once in 728 labors; Smellie, once in 125. In this country, it has been applied once in 158, in 188, and even once in 353 cases, while Merriman used it once in 93 cases, and Mr. Burns, who dislikes the expectant plan of Osborne, used it once in 53 cases. Mr. Beatty states that he has lost but three women after the use of the forceps, and Mr. Burns, who boasts that he has abandoned the pernicious practice of Clarke, says that he has become as great an advocate of instruments in prolonged labor, as Osiander and Hamilton. In Germany, they are still more impatient, for it appears that in 350 labors M. Hagen used the forceps 93 times, and the crotchet 28 times. M. Nægele, whose practice is so celebrated, admits that he has used it once in 53 cases.

12. At the Hôtel Dieu at Paris in 1829, it was applied once in 280 cases; at the Hôpital Saint Louis in 1828, once in 240 cases; at Liege in 1808, twice in 216 cases; at Strasburg in 1825, twice in 85 cases; at Troyes, twice in 1262 cases by M. Pigeotte.

M. Richter used it 15 times in 2571 cases in the hospital at Moscow, and 34 times in 624 cases in private practice. M. Carus used it 19 times in 220 cases in 1827; Siebold, 15 times in 137 cases; M. Kluge, 15 times in 268 cases; M. Kilian, 120 times in 12,000 cases; M. Riecke, 2740 times in 220,000 cases; Mr. Hart, once in 398 cases; Mr. Cusack, 3 times in 313 cases; Cini-selli, once in 94 cases; M. Merrem, 14 times in 157 cases. Having established that the forceps is preferable to version when it can be applied, I will only state that, in the statistics of M. Riecke, we see 1600 dead children in 3000 cases of version, while there are only 680 in 2700 deliveries with the forceps.

The *céphalotribe* should not be thought of except where the pelvis is contracted.

ART. II.—OF THE LEVER.

Herbiniaux and Denman have decidedly maintained that the lever is incomparably superior to the forceps; and notwithstanding that it has not been so highly thought of in France, it has occupied much of the attention of the physicians of our country since the middle of the last century.

Its inventor is no better known than that of the forceps. Was the idea of it derived from the *uncus* of Celsus or the *curette* of the lithotomists? Is it the instrument made use of by the Chamberlains, as Mulder pretends, or the spoon of Palfyn, or one of the branches of Smellie's forceps, variously modified? Still it is true that Roonhuysen, who made a secret of it, acquired celebrity as an accoucheur, by means of a peculiar instrument, since used under the title of *Roonhuysen's lever*. This instrument, which, from Roonhuysen, passed into the hands of Bruyn, was purchased and made public by De Vischer and Van de Poll in 1753; but, as was the case with regard to the forceps, a great number of very discrepant accounts of it appeared in the course of a short time. There was soon a lever by Boom, another by De Bruyn, a third by Titsing, one by Palfyn or Heister, one by Cole, one by Griffith, a lever by Wathen, one by Aitken, &c. There was no less discrepancy upon its mode of acting. According to some, it was to be applied to the occiput, *potentia agit in os occipitis*, was the family secret; according to others, it was to be applied to the temples. Titsing directed it to be applied to the mastoid process; and, lastly, others thought it should be fixed upon the side of the chin. As to its advantages, if De Bruyn

PLATE XI.

THE FORCEPS AND OTHER INSTRUMENTS.

FIG. I.—THE AUTHOR'S FORCEPS.

- a, a.* The left or male branch.
- b, b.* The right or female branch.
- c.* The articulation.
- d.* The olive-shaped extremity of the crotchet.
- e.* The point of the crotchet.

FIG. II.—THE SAME FORCEPS SEEN FROM THE SIDE.

- a.* The flat portion of the pivot.
- b.* The shoulder-like projection of the handle.

FIG. III.—THE KEY.

FIG. IV.—SMELLIE'S FORCEPS.

- a, a.* The blades wrapped with leather.
- b, b.* The wooden handles.

FIG. V.—INNER VIEW OF A BRANCH OF THE SAME FORCEPS.

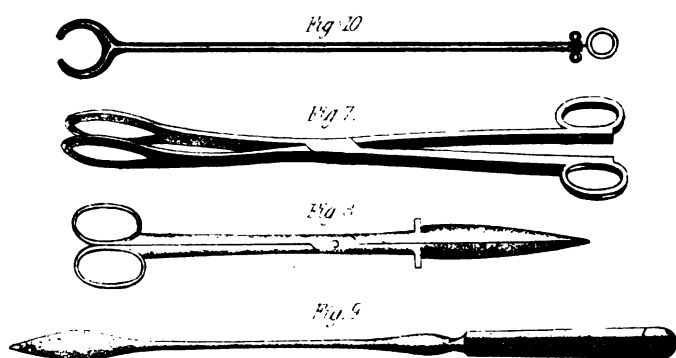
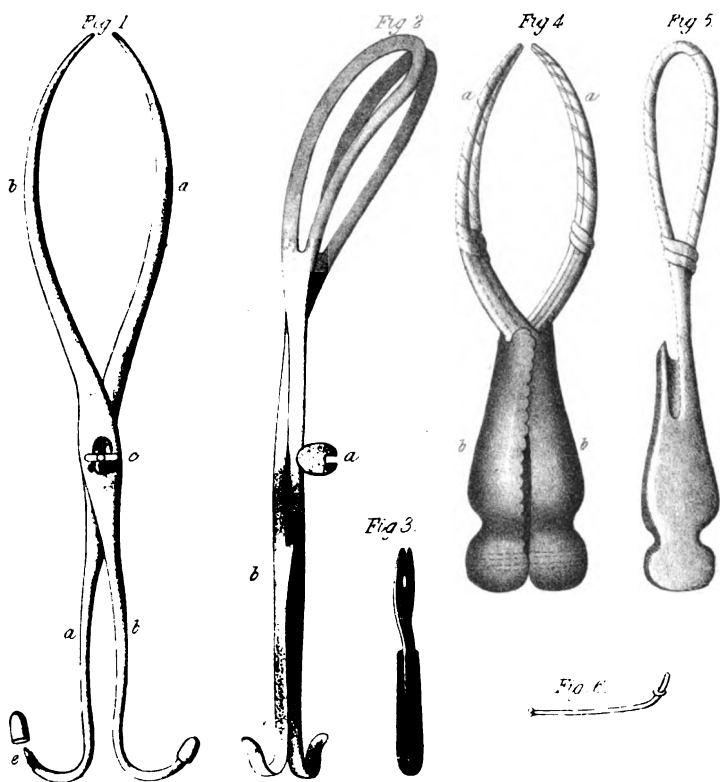
FIG. VI.—A LARYNGEAL TUBE.

FIG. VII.—PINCE A FAUX GERMES.

FIG. VIII.—CRANIOTOMY SCISSORS.

FIG. IX.—A SIMPLE PERFORATOR.

FIG. X.—M. GUILLON'S PORTE CORDON.



was to be believed, they were immense; no difficulty could withstand it; whether the head were reversed, arrested, or locked, the lever triumphed over them all, and by means of this marvelous instrument, the Dutch accoucheur pretends to have unlocked eight hundred heads in the course of forty-two years. The French authors have, on the contrary, maintained that it is only useful in correcting the positions of the head, in compelling the reverted occiput to replace itself at the centre of the pelvis.

However this may be, instead of a bar of steel about ten inches long by an inch and a half in breadth, curved at each end like a spatula, enveloped in adhesive plaster, according to De Bruyn, or chamois leather, as Boom says; instead of a simple spatula or kind of flat spoon, the handle of which was terminated by a broad ring, which constituted the lever of Titsing—the modern lever, such as it appeared when modified by Pean and Baudelocque, is nothing more than one of the branches of Smellie's forceps, very much elongated, without its notch, and very little curved. This stock, the blade of which is very widely fenestrated, and the root supported by an ebony handle, has also been itself modified in a great variety of ways by the moderns, either in regard to its length, or the degree and shape of its curve, or because some have added a joint in the stock, so as to bend and make it more portable. That of Lowder is the best, says M. Blundell, and the rules laid down by M. Gaitskell are those which direct us best in its application.

§ 1. USE OF THE LEVER.

Subsequently to the idea originated by the axiom of Roonhuysen, and which has particularly been adopted among us, it was generally agreed that the lever is not destined to supply the place of the forceps, that at most it can but serve to restore the flexion-movement of the head, by hooking down the occiput; thenceforth its employment necessarily became much restricted, for under those circumstances the fingers almost always suffice, and if, after all, any instrument were necessary, one of the branches of the forceps would answer as good a purpose as the lever itself.

But this is not the view the English accoucheurs take of the subject, nor that taken by its inventors, nor indeed is it a correct one.

The lever is an instrument that is applicable to two different objects: on the one hand, it may be employed for the purpose of restoring or reducing the head to its natural position; and on the other, it is possible to make use of it, as we do of the forceps, to extract the head when it has descended into the excavation.—In the former case, the fingers, or one branch of the forceps, might, strictly speaking, in most circumstances, be substituted for it: but in the latter, I am convinced that it is susceptible of advantageously taking place of the forceps, and that pretty frequently. In the first case, it acts upon the occiput, or on a parietal protuberance, like a simple crotchet; in the second, it really performs the office of a lever of the first kind.

As a crotchet, the lever offered for sale by the different cutlers in the vicinity of the *Ecole de Médecine*, and which is very nearly the instrument modified by Pean and Baudelocque, and particularly that of Flamant, leaves nothing to be desired. The modifications of Herbiniaux, who changed the handle into a sort of syringe, and who insists on passing a ribbon through the blade close to the fenestra, are perfectly useless.

As a lever, I prefer one that is rather shorter, and that may shut up by means of a hinge joint, which does not at all diminish its strength; further, it ought to be straight from the extremity of the handle to within about three inches of the end of the blade; the latter should be broad, oval, and ending in a long flat neck, which narrows, gradually to continue into the handle; its curve should be considerable, at least greater than that of the forceps; with the exception of the

middle part, its concavity, that which ought specially to bear upon the head, it ought to be very well polished; and lastly, in the construction of such instruments the best steel ought to be selected.

1. *Use of the Lever as a Crotchet.*—If, then, it be intended to make use of the lever in conformity to the principles of the French authors, it must be taken hold of with the right hand for the right occipito-iliac position, and with the left hand in a case of the left occipito-iliac position, and with either hand in the antero-posterior positions. Introduced with the same precautions as if it were one of the branches of the forceps, it is passed up between the surface of the genital organs and the child's head, until it gets beyond the occipital projection or parietal protuberance, and in such a way that its concavity may be easily applied to one of the parts above mentioned. As, in the occipito and fronto-pubic positions, it is impossible to pass it up directly behind the occiput, it must be at first carried a little to one side, and afterwards conducted on to the part which it is intended to depress. When it is well placed, the hand that directed the blade takes hold of the neck of the instrument; in order to make sure that it shall not slip, and that the back of it shall not rub against the soft parts of the woman, the operator should employ the extracting force with the hand that holds the handle, in a direction backwards, forwards, or sideways; in short, in a direction opposite to that pointed to by the protuberance which he wishes to depress. In general, the interval between the pains is to be selected for acting; and as soon as the vertex has reached the centre of the pelvis, the operation is complete; the instrument is to be withdrawn, and the labor abandoned to itself; or, if necessary, other means of assisting it are resorted to. Flamant, who desires to revive the use of the lever in France, and who has used it as a crotchet, maintains that one hand should be placed on the opposite side of the head, and that it should act conjointly with the lever to extract it. In this way, says he, the lever may often take the place of the forceps with advantage, but when this end is proposed, the following method should be preferred.

2. *Use of the Lever as Forceps.*—The use of the lever, after the manner of the Dutch and English accoucheurs, that is, as a substitute for the forceps, is very simple as to its mechanism: in the first place, it is best that the head should be in the excavation; then that it should have already, or at least chiefly, executed its pivot-movement; in the third place, that there should be but a slight degree of contraction of the inferior strait, or that the retardation of the labor should depend solely upon a want of action of the womb, or of the woman herself. Whatever may be the position of the head, the right hand must be made use of for extracting with, at least in all cases where the accoucheur is not left-handed. For the purpose of introducing it, we have recourse to the right hand, if the lever is to be passed upon the right side of the pelvis, and to the left hand in the contrary case.

Where the occiput is in front, or somewhat to the left, the left hand introduces the lever, as if it were the right branch of the forceps, in front of the right sacro-iliac symphysis; when it has passed up sufficiently far, the action of the two hands is combined so as to guide the concavity of its blade on to the right temporo-parietal region, that is to say, in the direction of the occipito-mental diameter, and on the same parts that would be embraced by the corresponding blade to the forceps. The left side of the vertex is supported by the fingers of the left hand; the thumb, placed near to the vulva, embraces the back of the lever, to which, conjointly with the right side of the pubic arch, it serves as a *point d'appui*; we are now to wait for a pain, and then draw down slowly but strongly, as if we were making a lever of the first kind swing from below upwards, and from left to right; the head generally yields readily; it is gradually drawn down in the axis of the inferior strait, which it clears as it executes its extension-movement, after which the lever becomes useless.

In this way the force exerted upon the head acts in a direction from the chin towards the occiput, or in that of a line drawn from the angle of the right jaw to the left side of the vertex; so that, as it is supported elsewhere by the left side of the pelvis, there is nothing surprising in the circumstance that it allows itself to be so easily extracted.

Should the occiput be on the right side, in the second position, for example, the lever ought to be introduced with the left hand; but then it must be changed, as above, and the right hand, seizing the handle of the instrument, should also extract in the same manner, with this difference only, that the see-saw movement should take place from right to left, and not from left to right.

Should the vertex be turned backwards instead of towards the front of the pelvis, the lever ought to be applied to the temporo-parietal region, in the direction of the occipito-bregmatic diameter, and the see-saw should be performed in such a way that the occiput, which ought here to support the principal effort, may escape first in front of the perineum, and be strongly raised towards the centre of the vulva; this position is less favorable than the other, without doubt, but still it is not very difficult.

I know that what the lever effects under these circumstances could be equally well done by the forceps, and perhaps with more certainty; and, indeed, it is not my design to substitute the former of these instruments for the latter. I have merely wished to show that, among us, the mechanism of the lever has been generally misunderstood; that its employment, without being indispensable, is perhaps not to be despised; and that its application is too simple, too harmless, as compared with that of the forceps, for it is not to be had recourse to where the head presents at the perineal strait, and appears to be arrested only by want of action of the woman's organs. I will even add that its introduction will often be attended with the great advantage of exciting the uterine contractions, as well as those of the abdominal muscles, and thereby of accelerating, at least indirectly, the termination of the labor, without exposing either the woman or her child to any danger. I am happy, moreover, in finding myself supported in almost the whole of this doctrine by M. Désormeaux. Ford, who employs nothing but the lever; Douglas, Sims, and Croft, who prefer it to the forceps; and Blundell, who also praises it, have always used it in this way, at least they have not adopted the direction of Flamant in its application.

SECT. III.—OF THE FILLET.

The noose consists of cloth, thread, or silk, wool, leather, or cotton, sometimes strengthened by the addition of bulrushes, whalebone, brass-wire, or plates of iron or steel, variously interlaced and worked, and which was formerly applied to different parts of the fœtus, so as to effect its extraction. The employment of these means is of very ancient date, and doubtless extends back as far as the age of Hippocrates. Previously to the discovery of the forceps and lever, the noose or fillet was the only instrument made use of for the extraction of the child, where there was some hope of preserving its life. Avicenna recommends that it should be applied to the trunk; but it was particularly with a view of fixing it upon the head that Mauriceau, Pugh, Smellie, Burton, and others thought of a sort of purse, sheath, cap, sling, and little bands which are now wholly forgotten. If the forceps is a substitute for all the various nets that were formerly applied to the head, turning by the feet, which is better understood, and especially better executed than it was previously to the last century, also renders superfluous all the fillets which certain accoucheurs used to apply to the trunk for the purpose of extracting it artificially; so that at present the noose is merely a strip of linen, silk, or worsted, about an ell in length and an inch wide, by means of which a limb that has escaped from the organs is secured, while we

proceed to search for the other one, or the rest of the fœtus. Some persons, however, still make use of it for the purpose of employing extractive force upon the ham, the groin, or the axilla; but, as the blunt hook or fingers always offer us greater advantages, it is really useful only when applied to the wrist or ankle in arm presentations, or in turning and delivery by the feet.

In order to apply it, the strip is in the first place to be doubled; then a slip-knot is made upon it, and held apart with the end of the thumb and two or three of the fingers of the hand which is to take hold of the foot or the hand of the fœtus; after this, it is slipped up and secured with the other hand, the noose being fixed above the articulation of the tarsus or carpus; it is then given in charge to an assistant who is to hold it, but without pulling it, while the operator proceeds to search for the other parts that he wishes to bring down to the inferior strait. When both of the lower limbs have been brought down, there is no further use for the noose, provided it had been secured upon the leg; if it is upon the wrist, it may still be of service in keeping the arm extended along the body, and consequently in favoring the delivery of the corresponding shoulder. To conclude, the noose is a means whose application at the present day is confined within extremely narrow limits, and whose mechanism is too easily understood for it to be needful that I should say anything further about it here.

SECT. IV.—OF THE LOCKED HEAD.

According to Peu, who, after Ætius, was the first writer to speak of it, the head is *locked* in the passage whenever it is firmly held betwixt the pubis and sacrum, without being able to advance or recede, and so that it is almost impossible to apply the instrument to it. According to De la Motte, the head, when locked, is griped by the bones of the pelvis, like the key stone in an arch. Rœderer presents another view of it: he thinks that, in order to constitute locked head, the head must be so embraced in the strait, or in the excavation, by every point of its circumference, that a lamina of metal or the smallest probe cannot be passed between it and the organs of the woman. When the head is locked, says Deleurye, who admits of a true and false kind, and enclosed between the two straits, it can neither ascend nor descend. Baudelocque says that the head is locked, whenever it is fixed at the superior strait by the two extremities of one of its diameters, so that it can neither advance under the influence of the natural powers, nor be forced back by the hand of the accoucheur. In locked head, according to Flamant, the head is grasped between two opposite points, is immovable from above downwards, may be pushed up, but is subject to no movement of rotation.

Baudelocque's definition, which has been adopted by all modern accoucheurs, and slightly modified by M. Désormeaux, is without contradiction the most correct, and may be construed as follows: the head is locked in the pelvis whenever two diametrically opposite points of its superficies are so compressed that it cannot possibly descend under the influence of the expulsive power alone, and when it cannot be pushed up without the very greatest difficulty. The locked head, according to the view of it presented by Rœderer, or *paragomphosis*, cannot possibly occur. Madame Lachapelle will not even admit the existence of any species of it, and thinks that all that has been written under that title ought to be referred to vicious conformations of the pelvis, to bad positions of the head, or, lastly, to powerful and permanent contractions of the uterus.

However this may be, locked head has become very rare at the present day, and De Bruyn, who pretends to have met with eight hundred cases of it in the course of forty years—Berkman and Titsing, who cite two hundred and sixty-two cases in nineteen years of practice—must have had a different idea of it from us. It is to me evident, from the accounts given by Camper on this subject, that the

Dutch accoucheurs gave the denomination of locked head to all cases in which the head, from being arrested in any way in the pelvis, makes the employment of Roonhuysen's lever necessary; so that what they have said concerning locked head has almost no connection with what has since been written by Baudelocque under that title. Dr. Dewees, who treats of locked head upon the principles of Baudelocque, is astonished that he scarcely ever meets with it, and thinks that the circumstance depends upon the American women having better formed pelves than the European women; but he would probably hold a different language if he knew that Madame Lachapelle never met with it at all, and that but a few instances of the kind are met with in the course of a year in Paris.

In the first place, the case where the head is simply fixed at the superior strait, because the liquor amnii has been long discharged and the womb is closely contracted upon the body of the child, must not be confounded with locked head, nor that case where it stops in the excavation, betwixt two very contracted straits, and after having with great difficulty cleared the superior pelvic circle, nor those in which its escape is prevented by the resistance of the perineum or narrowness of the inferior strait.

A. *Mechanism*.—The head can scarcely become locked except between the pubis and the sacrum, at the superior strait; further, in order that it may happen at all, the conjunction of a great number of conditions is required: 1. That it shall present in a direct manner. 2. In a well-formed pelvis, it must be of enormous size. 3. The narrowness of the pelvic cavity shall not exceed a certain degree; or, as Oslander maintains, it must be *reniforme*. 4. There shall be a space of three inches and a half between the sacrum and pubis for an antero-posterior position, or three inches for a transverse position; for locked head cannot take place except where the head can get as low down as the level of its greatest thickness. 5. The uterine contractions must have been energetic.

Among these conditions, there is one upon which I must dwell for an instant. I find a difficulty in conceiving how the occipito-frontal diameter can really get fixed in this way in the sacro-pubic diameter. The ends of the lever, which it may be considered to represent, are too unequal for its occipital portion to fail to come down first, especially when the efforts of the woman react violently upon it through the intermedium of the vertebral column. It seems to me, then, much more probable that it is the occipito-bregmatic diameter that becomes locked, and that the head may be retained betwixt the sacrum and pubis, as well by any one of the other diameters of the occipito-bregmatic circumference as by the bi-parietal diameter alone.

We may further admit, along with M. Désormeaux, that locked head may sometimes take place in the excavation, when the sacrum, flat, or nearly flat, makes the head pass along a canal that gradually diminishes in size, as it descends, until at last it cannot turn upon its axis, nor advance nor recede, beyond a few lines, towards the superior strait.

B. *Signs*.—Tumefaction of the lips of the os uteri and external organs of generation, and an extreme degree of swelling of the hairy scalp and overlapping of the cranial bones, have been given as signs of locked head; but most of the phenomena may take place without the locked head, and are, therefore, no sufficient basis for a sure diagnosis.

The pathognomonic sign, in these cases, is derived from the fixedness of the head, which, in spite of the energy of the pains, makes no advances for several hours together. While the pain is present, it seems to advance a little; but immediately afterwards it rises again up to the same point it occupied before. If the accoucheur endeavors to push it up again with his hand, he finds that it is immovable, and he cannot succeed in dislodging it but with the greatest difficulty.

It should also be understood that, by elongating, the head may appear to descend, and approach near to the vulva, although its position does not really undergo any alteration. This circumstance must be what has so often deceived the accoucheur, making him suppose that the superior strait was cleared, while in fact the occipito-bregmatic circumference was not as yet engaged in it. An examination is made; the vertex is found a few lines from the vulva, whence the conclusion is drawn that it has descended into the excavation. To avoid this mistake, and understand it, the practitioner should remember: 1. That the symphysis pubis is only from eighteen to twenty-four lines in depth, and, consequently, that the swelling of the cranial integuments may easily bring the vertex down even with the vulva, although the parietal protuberances are still at the superior strait; 2. That the finger must be carried backwards, especially, and not merely in front, when we wish to ascertain what part of the pelvis is occupied by the head; and 3. That the locked head may take place below the superior strait.

C. *Dangers*.—There are several degrees of this cause of dystocia. Sometimes the disproportion between the head and pelvis is so small that it only results in a somewhat slower labor and more fatigue for the woman; at other times, it is so great as to render the delivery excessively difficult, but not absolutely impossible without assistance, provided the contractions are well sustained; again, lastly, it is so great that nature is absolutely unable to triumph over it, and the resources of art become indispensably necessary.

In the case first mentioned, the locked head is not very dangerous, and ordinarily is accompanied only by a slight degree of irritation and disposition to inflammation.

In the second and third, it constitutes a serious accident, both as regards the mother and the child. The pains, which follow each other to no purpose, though strong and frequent, at length end in a state of general exhaustion and inertia, should the woman even be so fortunate as to escape an attack of inflammation of the womb or peritoneum, a flooding, or convulsions. The bladder, the rectum, the vagina, the urethra, and other soft parts in the pelvis, from being long and severely compressed, may become contused, ulcerated, or gangrenous, and give rise to fistulæ that are too commonly incurable, or to some other alteration equally terrible. The compression of the nerves, and of the vessels in particular, may give rise to paralysis, tumefaction, and the infiltration of the lower limbs and vulva; the symphyses themselves, from being violently distended, occasionally run some risk, where the expulsive efforts are vigorously sustained.

The long continuance of the labor after the discharge of the waters, and the direct action of the contractions upon the body of the child, expose it, in the first place, to the same accidents as all long and difficult labors, that is to say, to asphyxia and death. Again, the head, particularly where the pelvis is badly formed, or when the sacro-vertebral angle is very salient, cannot adapt itself to the straits or excavation, as in a mould, without the brain itself undergoing a dangerous, and sometimes fatal compression. It may also be followed by fractures, and external or internal extravasations, lacerations, &c.

D. *Treatment*.—It is clear that, in order to avoid so many dangers, the practitioner ought promptly to interpose for the assistance of the powerless organism, but by acting speedily there is risk of acting unnecessarily, and by waiting he may lose the opportune moment. How then are these two extremes to be avoided? The well-informed physician will readily succeed in this difficulty by taking care not to lay it down as a principle, as has been recently done in some medical journals, doubtless from oversight, that he must make haste to extract the child with the forceps, whether the head is locked or not, whenever it has remained an hour or two in the excavation. The woman ought never to be assisted in this way until there is a certainty that the head will not pass the passages spon-

taneously, or that the delivery will not take place, without exposing the patient to the accidents heretofore indicated.*

Turning by the feet, as recommended by the ancients, must not be performed merely because the head is really locked; the slings, bandages, and fillets would in such cases be wholly insufficient, and are at present no longer recommended by anybody. The lever, the spatula, and the separate branches of the forceps, so much lauded by the accoucheurs of the last century, were successful only because they were employed in cases very different from those which are understood to be locked head at the present day. Roonhuysen's instrument is manifestly incapable of compelling the head to descend, where there is a disproportion between it and the straits. It might, at the most, serve to dislodge it and give it a more favorable position, and in that case it would not be absolutely locked.

It is otherwise with the forceps, which admits of the efforts of the accoucheur to be conjoined with those of the womb and abdominal muscles. However, as the clams can be applied only upon the sides of the pelvis, some practitioners have objected that, by compressing the head in a line from right to left, this instrument might augment the pressure already experienced from front to rear, instead of diminishing it; that it is better calculated to give rise to locked head than to relieve it; and consequently, more dangerous than useful. But these fears, inspired by theoretical views of the subject, must yield to facts; besides, it is not correct to say that the diameters of the head gain by compression in one way what they lose in another. I repeat that I am certain the forceps succeeds in extracting the locked head far more by compelling it to traverse a circle, which acts upon it like a ring, than by reducing it by means of a direct pressure.

Should it not succeed, and if the child were ascertained to be dead, recourse should be had to cephalotomy, and then to the crotchet; but if the fœtus were still living, the operation of symphyseotomy would be indicated, and ought to be preferred to the Cæsarian operation, which, in such a case, can never be necessary.

The retention of the shoulders described by Solingen in his *Embryulkie*, and by De la Motte, who reports a case, which is admitted by Deventer and Heister, which Deleurye long since rejected, which Levret distrusts, and which Røderer thinks only applicable to the head, although he remarks that the mother-in-law of Forestus never wished her daughters to marry men with broad shoulders, although she had twenty children, and which Osiander still regards as possible, is no longer a cause of uneasiness with accoucheurs. The head is already in part beyond the inferior strait, while the shoulders are still free above the superior.

The retention of the breech, admitted by Weyer, is still more difficult to comprehend, and does not seem to me to deserve the least attention.

I will not conclude without remarking that all that has been said of locked head relates almost exclusively to deformities of the pelvis, and that, strictly speaking, we can only comprehend under this title all of those cases in which the head, after becoming more or less engaged, becomes retained, no matter in what manner, by the bony passages.

SECT. V.—NARROWNESS OF THE PELVIS.

When the pelvis is so deformed as to render delivery impossible, even with

* From reading this sentence one might infer that the forceps is applicable only for the safety or comfort of the mother; but, surely, the security of the offspring demands a share of our attention, and the legitimate uses of the instrument are as frequently connected with the infant as with the parent. Many children are rescued from death by speedy delivery with the forceps, the instrument being employed solely in their behalf.—M.

PLATE XII.

DIFFERENT INSTRUMENTS.

FIG. I.—FORCEPS CEPHALOTRIBE OF A. BAUDELOOQUE.

FIG. II.—THE JOINTED LEVER SEEN FROM ITS FRONT.

FIG. III.—THE SAME INSTRUMENT A LITTLE BENT, SEEN FROM ITS SIDE.

FIG. IV.—ROONHUYSEN'S LEVER, SEEN FROM ITS FACE.

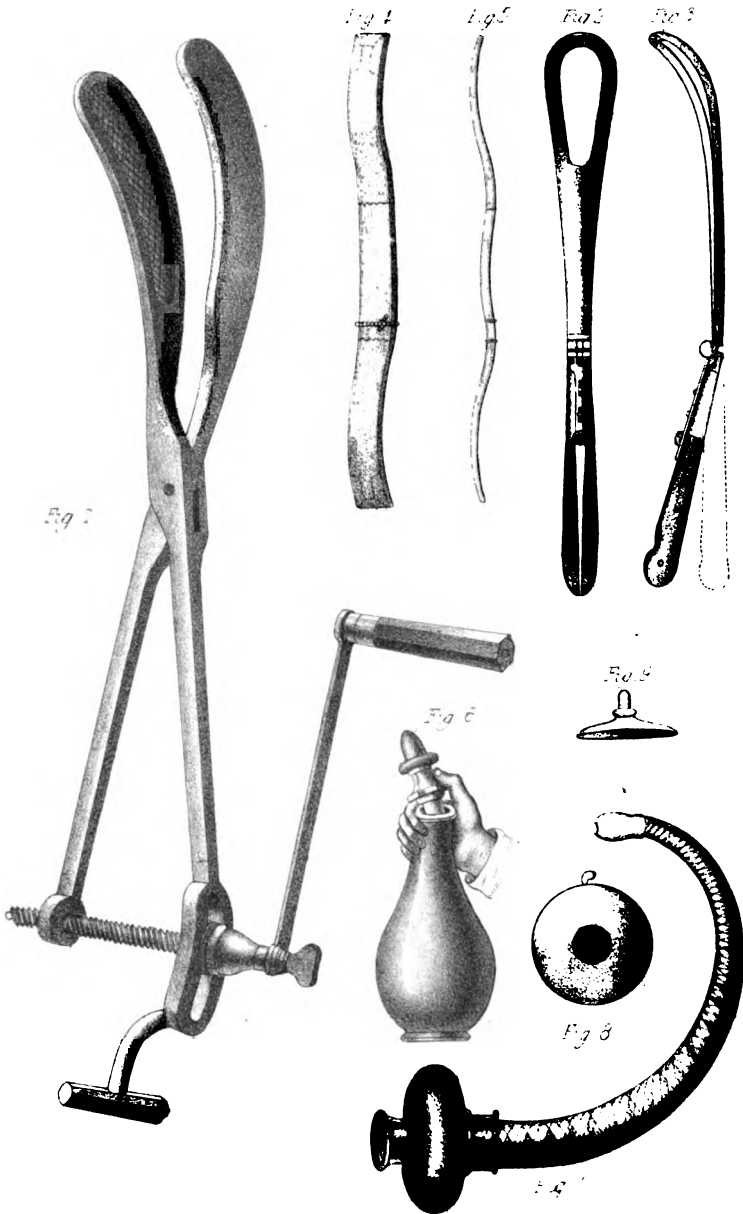
FIG. V.—SIDE VIEW OF THE SAME INSTRUMENT.

FIG. VI.—THE SUCKING BOTTLE OF SIEUR DABO.

FIG. VII.—A BREAST PUMP.

FIG. VIII.—THE CUP SEEN FROM WITHIN.

FIG. IX.—THE NIPPLE AND UPPER PORTION.



the assistance of the means I have now passed in review, there remain only three kinds of resources for the delivery of the woman: 1. To act upon the fœtus so as to lessen its size; 2. To increase the size of the pelvis; 3. To extract the child by an artificial passage. As these three modes of delivery are excessively dangerous, whether to the mother or her offspring, it is necessary, previously to putting them in practice, to determine in what cases they are really indispensable.

To attain this object, the accoucheur ought to know the exact dimensions of the head and pelvis, and the diameters which correspond to each other in the different stages of labor; also, to know how far the head is capable of being reduced, and what amount of courage and energy is likely to be exhibited by the woman; but these notions can only be acquired approximately. Notwithstanding the numerous cephalometers proposed by various authors, and in spite of the means recently indicated by M. Foulhoux, we must still depend upon the finger for the most certain result under such circumstances: and, with the exception of M. Flamant, what practitioner is so bold as to dare to pronounce that the dimensions of a head he has just examined are, within from two to three lines, of precisely such or such an amount? The degree of solidity of the pelvis, the form of the contracted strait, and the direction of its axis, also deserve the most serious attention. The work of M. Nægèle, on the arrangement of the axis and planes of the pelvis, one of the most complete that has been published, should be carefully examined on this point. For example, the symphysis may be softened to such a degree as to admit of the bones sliding one over the other, so that one os pubis may extend in front, while the opposite coxal bone falls backwards, which would render the corresponding oblique diameter so much longer. According to Deventer and Madame Lachapelle, the two hip bones may also be both carried forwards by the forcing of the sacrum into the space between them, and thus give rise to an unexpected augmentation of the sacro-pubic diameter. If the superior strait is of the shape of a figure of 8, or if the contraction occupies only one side, the head, being situate transversely, with the occiput towards the widest part of the pelvis, may sometimes traverse the canal, notwithstanding a considerable degree of contraction.

Where the axis of the strait approaches that of the spine, the two extremities of the bi-parietal or the occipito-bregmatic diameter will be compelled to engage at the same time, and will require a space of about three inches. Should it, on the contrary, be very much inclined to the front, one of the parietal protuberances might engage before the other, so as to allow a gain of three or four lines in the act of passing through the pelvic circle.

On the other hand, a head that is very flexible, and energetically urged onwards by the uterine and muscular contractions of a vigorous woman, may be elongated and moulded in the passages, be considerably reduced (Denman says to one-third of its original volume), and, according to Baudelooque, attain to the length of eight inches, while its thickness is proportionably diminished; it may become so much flattened as to pass through a strait of two inches and a half, and recover its ordinary volume within the excavation, if we may give credit to the assertions of Boer; and, in all cases, admit of the child's being born alive. A woman whose pelvis measured but two inches and a half in its sacro-pubic diameter, was delivered without assistance at the amphitheatre of Solayrès. M. Noury mentions another, who was about to submit to the Cæsarian operation, and who delivered herself unaided, of a child weighing six pounds and a half, whose coccy-pubic diameter measured but eighteen lines. M. Faurichon states that, in 1831, at the *Maternité* at Paris, he saw the head of a child escape, while they were attempting to apply the forceps, and that, after the death of the mother, the sacro-pubic diameter was found to measure but two inches and nine lines. The child was dead, and its head was reduced to two inches and nine lines in its bi-parietal diameter. Lastly, how many women are there who have been fortu-

nate enough to bring their children into the world without any aid, when in their previous confinements they could be delivered only by symphyseotomy, the Cæsarian operation, or embryotomy? Here, then, the operator stands in need of all the integrity of a sound judgment, of prudent and sage counsels, of attention to a thousand diversified circumstances, and of proceeding only with extreme caution, if he desires not to compromise the dignity of his art, or the safety of those beings who look to him for the conservation of their existence.

Instead of accommodating itself to the form of the openings, the head may be fractured, or the brain mortally compressed. Long-continued pressure upon the fœtus, and particularly upon the umbilical cord, which most commonly gets down into the excavation, rarely permits it to escape with its life; the woman herself soon becomes exhausted; the bladder and other soft parts, against which the head presses with great violence, may inflame, be lacerated, or perforated. The womb, violently irritated by its repeated contractions, may be ruptured, and death ensue. The softening and separation of the symphyses often leave behind them a movable state of the articulations, and a degree of lameness which are at least very troublesome, and, where the distension is carried to a great extent, are often followed by caries and abscesses, which sooner or later terminate in the death of the patient. There are, therefore, two evils, which it imports us to avoid with equal care; there is a just medium which we should endeavor to secure.

Let us suppose that the application of the forceps and turning have been attempted in vain, or that the pelvis is so deformed that no greater confidence is to be placed in those means than in the efforts of the woman, one question presents itself; on whom shall we operate—the child or the mother? Where there is a certainty that the pelvis is so contracted as to render the delivery of a mature and full-grown child either dangerous or impossible, have we a right to bring on abortion, either at an early stage of pregnancy, or only between the seventh and eighth months. Would it not be possible, by means of regimen, or of a debilitating treatment, to oppose, to a certain extent, the development of the fœtus, so that at full term it shall be of very small size?

ART. I.—OF REGIMEN, AS A MEANS OF ENABLING WOMEN WITH CONTRACTED Pelves TO BE DELIVERED WITHOUT THE ASSISTANCE OF ANY SURGICAL OPERATION.

Were it true that the strength of the fœtus, while enclosed in its involucri, is always in proportion to that of the mother, nothing would be more natural, nor better indicated, than to weaken a deformed woman during the progress of her pregnancy. But, as the most robust women do not always bear vigorous children; as those who are naturally feeble and sickly often give birth to very stout and large ones, it is to be feared that the severest diet and most abundant sanguine evacuations would only serve in such a case to incapacitate the woman from supporting the operations that would, notwithstanding, be requisite when she should fall into labor. I know one person who, having been delivered twice by means of art, was bled ten times, and confined to a vegetable diet during her third pregnancy, with a view of retarding the growth of the child. This lady was, it is true, exceedingly weakened by it, but the fœtus did not appear to have been affected, and in parturition she required the same succors as before. Another woman who had two very fatiguing pregnancies, and could not be delivered until after three days of painful labor, and then by means of the forceps, also became pregnant for the third time, found herself less incommoded than usual, and was, nevertheless, delivered without assistance, and without difficulty, of a child sensibly smaller than the preceding ones. I am well aware that practitioners worthy of credit, as Assalini, Merriman, and Moreau, assert that they have obtained directly contrary results; and I can well conceive, as a general rule, that, by exhausting the woman, the growth of her offspring will be retarded; but there

are so many exceptions to this rule, and what we gain on the one hand is so disadvantageously compensated by the loss of resources of which we deprive ourselves on the other, that I would scarcely venture to recommend such a course, first proposed by James Lucas, except to persons affected with a very slight degree of contraction, and in whom delivery might, in fact, take place spontaneously, should the head of the fœtus not be very large.

ART. II.—ARTIFICIAL PREMATURE LABOR.

It was about the middle of the last century that the most distinguished physicians of London decided that, in women affected with deformity of the pelvis, it is proper to solicit delivery as soon as the viability of the child is well established. According to the statement of Kelly, Macaulay was the first person who had recourse to this operation, which resulted favorably in his hands. Sue pretends that the idea originated with A. Petit about the same time. M. Dezeimeris seems to ascribe it to Puzos. It has been also referred to Deventer, who says that it is sometimes necessary to bring on labor between the seventh and ninth month to save the life of the mother; but it is easy to understand that Deventer and Puzos entertained different views from Kelly, who proposed his operation in 1755. It was revived twenty years afterwards, according to Burns, by Roussel de Vauzesme. Since then, Dr. Barlow has published a memoir in which he attempts to prove that artificial abortion ought to be substituted for the Sigaultian and Cæsarian operations in all cases. May, the father-in-law of M. Nægele, has boldly maintained the opinion of Kelly in Germany, since the year 1799. Ramsbotham says he brought on abortion three times with success in a woman in whom the perforation of the fœtal head had been deemed necessary in a preceding pregnancy. Drs. Davis, Clough, Wigand, and, very recently, Bang and Dr. Blundell, have supported the doctrine advanced by Barlow. M. Costa has even inquired whether it is proper to resort to it in the cases of women affected with aneurism of the heart.

In France, this question has been considered under a point of view which has not admitted of a discussion of its value. It was at first confounded both by myself and others with that of abortion, although there is a great difference between them. In induced abortion, it is proposed to destroy the ovum for the preservation of the mother. In premature labor, on the contrary, we endeavor to deliver the child alive, without compromising the life of the woman, when they both run the risk of perishing if the pregnancy progresses to full term.

§ 1. THE INDUCTION OF ABORTION.

Abortion, which was frequently practiced formerly in the Greek republics, with which Aspasius is said to have been very familiar, and which Aetius and Paul of Egineta advise, should be considered out of the question and inapplicable, unless in cases of extreme contraction of the pelvis, when, for example, there is less than two inches in the sacro-pubic diameter. Its dangers are, however, less than they are said to be. At two, three, four, or five months, we may reach the ovum without difficulty with a bougie, or even with the finger. The womb will afterwards free itself of its contents, as it does of clots of blood, of false membranes, &c., and as it does in all cases of abortion. It is the abuse and criminal extension of such a practice which should be feared and deprecated, and not its restricted and reasonable use.

It has been said that no one has a right to destroy a living fœtus even in the first months of its existence. But delivery provoked previously to the seventh month kills it inevitably, and if it must be destroyed, why not wait until full term? The slight chance of a successful termination should not be destroyed. Doubtless this is generally true, but in the cases which I suppose there is no such

chance, and most women delivered at term, under such circumstances, perish. The question is, whether true humanity requires us to give the child a chance, at the expense of the Cæsarian section or symphysectomy.

For my own part, I confess I cannot possibly balance the life of a fœtus of three, four, five, or six months, a being which so far scarcely differs from a plant, and is bound by no tie to the external world, against that of an adult woman whom a thousand social ties engage us to save; so that, in a case of extreme contraction, if it were mathematically demonstrated that delivery at full term would be impossible, I would not hesitate to recommend abortion in the first months of gestation.

§ 2. THE ARTIFICIAL INDUCTION OF PREMATURE LABOR.

But the case is different whenever there is a space of two inches and a half, at least, between the sacrum and the pubis. As in that case the ovum has been seen to come away without assistance, and the fœtus born alive, the honor of the art and humanity combine to forbid the employment of any destructive instrument, or any attempt that must end in the death of the child.

Happily the method in question, that is, premature delivery, is really the best means of bringing the child away alive, without exposing it to injury. Indeed, it is not proposed to pass the hand rudely into the womb and to extract the child forcibly before term, by practicing forced delivery, but rather to induce the uterus to contract and to expel the product of conception, before the head of the child has acquired so large a volume as to prevent it from passing through the straits of the pelvis.

A. *Appreciation.*—The induction of labor at the seventh month would be particularly applicable where the pelvis is two inches and a half at the least, and two inches and three-quarters at the utmost, because it is clear, from measurements taken by Madame Lachapelle, that at seven months the bi-parietal diameter is at most not over three inches, and may be much less in extent, which gives the same chances as if the delivery were to take place at term, and through a strait of three inches and some lines. But how are we to learn accurately whether the fœtus is viable? If, for greater security, we should defer the operation till two weeks later, what assurance could we have that the head is not already too large to pass through the straits? And if it can clear them at eight months, is it not probable that it will succeed equally well at the end of the ninth?

A patient, whom M. Kelsch wished to submit to premature labor, delivered herself alone without any assistance, and without difficulty. In M. Vrolick's case the sacro-pubic diameter was three inches and three lines; it was the first pregnancy, and the child was born dead. One of the last cases, published in the name of M. Lovati, allows us to believe that the operation was not indispensable. I will add, with Madame Boivin, that it suffices to examine the work of M. Ferrario, to be convinced that premature delivery is often induced without necessity in Germany, Holland, and Italy. But we should not, on that account, reject its use. The dangers which have been considered its reproach, and which I myself attributed to it in part in the first edition of this work, have been singularly exaggerated in France, from the time of Baudelocque—who said that in hemorrhage artificial delivery is a *duty*, but that it is a *crime* in cases of contraction of the pelvis—up to the time of M. Capuron, who characterizes the operation as an *outrage against all law, both human and divine*.

1. *On the part of the mother*, at the present day, experience has proved that the dangers of the operation are reduced to a small matter. Hemorrhages, convulsions, peritonitis, scirrhus, and all possible alterations of the neck of the uterus do not occur more frequently after a provoked delivery than after an accouchement at term. The two women operated on by Kelly met with no accident. Duncan was not less fortunate in the eight cases which he reported.

It was the same thing with the woman who was operated on three times by Macaulay, and also with the case published by James, and with another mentioned by M. Riecke. Of the sixty-seven women mentioned by M. Salomon; of the twelve of M. Kluge; of the seven of M. Ferrario, not one perished. One only of the fourteen, mentioned by M. Reisinger in 1820, died. We may count two unfortunate cases among thirty-four collected since; but Merriman lost none in forty-six; from which we may conclude that the mother does not incur much more risk in a provoked delivery than in a spontaneous accouchement at term. Besides, these women died, one of hydrothorax, another of rupture of the uterus, and all of accidents altogether unconnected with premature delivery. The woman whose pelvis M. Stoltz showed me died during an attack of phthisis pulmonalis, six months after delivery. I can bear witness that the pelvis presented the conditions which require premature delivery, and that the history of the patient, given by M. Stoltz, proves that delivery would have been otherwise impossible in two preceding labors.

2. *On the part of the child.*—Provoked delivery is unfortunately not so encouraging for the fœtus. In the practice of Merriman, of forty-seven children, twenty-six were born dead, five were living though not *viable*, and sixteen only lived. Of twenty-seven cases, however, Hamilton saved twenty-three; Ferrario five out of six; M. Kluge nine out of twelve; M. Salomon saved thirty-four of sixty-seven; M. Burckhard thirty-five out of fifty-two; and Marshall only one in four, which is on the whole about one-half. But, as it has been nearly demonstrated that not one in ten survives at term, and that the operations by the aid of which delivery is effected expose the mothers to great dangers, so that a great number perish, this objection to premature artificial labor should not prevent it from affording a precious resource, which it would be inhuman to reject.

The dangers to the fœtus are, moreover, so much the less, all other things being equal, as it is advanced in age at the time of the operation. It is the want of viability, the extreme contraction of the pelvis, or the manipulations which we are forced to employ, which occasion the death of the child in such cases. Now, whenever we are obliged to provoke its expulsion, at the end of the eighth month, it is because the pelvis is so much deformed that we can hope for nothing better from any other method. If the danger arises from the resource adopted, it will increase with the period. The question is, besides, of so easy solution in the twofold point of view, as it regards both mother and child, that it should be looked upon in France, as it has been in other countries of Europe, in its true aspect. In order not to hesitate on this point, it is only necessary to compare the results of symphyseotomy, the Cæsarian section, and cephalotomy with those of premature delivery. We hope that this doctrine—elucidated as it has been by all that has been published in the journals; in the bulletin of Férussac; in the essays of Barlow, which embrace fifteen examples; in those of Merriman, the uncle, who cites ten cases; in those of Merriman, the younger, and of Kluge, who give at least fifteen; in those of M. Ritgen, who says that he observed nineteen cases at the clinic of Giessen from 1818 to 1822—which has been defended at Strasburg by Fodéré and Stoltz, and which is well explained in the dissertations of Burckhard, and Dezeimeris, and in the memoir presented to the Royal Academy of Medicine by M. Stoltz—will be soon universally adopted among us, as it has been in England, Germany, and Italy for many years.

B. *Indications.*—In fine, we may bring on premature labor when the diameters of the pelvis are less than three inches and two or three lines, and more than two inches and a half. It offers still some chance of success at two inches and a half, and even at two. In certain cases, it may be resorted to, although the straits measure nearly three inches and a half. It is true that, at term, the bi-parietal diameter rarely measures three inches and a half, and that one of

the parietal protuberances descends almost always before the other, and that the whole head is easily reduced two or three lines during labor; it is also true that the soft parts, the vitiated inclination and projections of the pelvis, take away at least some lines from the dimensions of the straits, and that, without presenting an insurmountable obstacle to the escape of the child, a slight pelvic coarctation often renders parturition extremely difficult. On the other hand, as the head is an inch smaller at seven than at nine months, and as it is susceptible of a much greater reduction, we may conceive that a viable fetus may in reality pass through a strait measuring two, or two and a quarter inches. The difficulty here is to determine exactly the extent of the pelvic diameters, and to establish with precision the age or development of the fetus; but this difficulty will be only met with in the extremes of the limits indicated, and when a first labor has already shown how much the organism is capable of. After all, what evil results when we are mistaken in a few lines? If the pelvis proves to be more capacious than we expected, the premature delivery will take place without any difficulty, and the child will run scarcely any risk. If the contraction is on the contrary greater, the fetus will doubtless only perish, and the woman will be saved, while at term the lives of both are jeopardized. Thus, far from proscribing it in first pregnancies, as many authors have done, it should be always put in practice when the pelvis measures from two and a half to three inches. Above or below that, we should wait for a first labor to clear up the diagnosis. With other than first labors, the embarrassment will be infinitely less. None have taken place unassisted. The forceps, version, or cephalotomy, has each time been indispensable, and the child has never been born alive. In this case, premature delivery is evidently the means which offers itself with the greatest prospect of success.

It is not, however, necessary that all the children born of the same woman should be still-born, to authorize such a practice, as Denman thinks; for, among the causes which may induce the death of the fetus, there are some which may disappear during several successive pregnancies; but I will undertake to say that this accident is the surest indication for its performance, when it actually depends on contraction of the pelvis.

Nature sometimes does that which art endeavors to generalize, and it is that which gives us our first lesson on this point. If certain women, who are so unfortunate as to be delivered only of dead children, in consequence of a narrow pelvis, after a time are brought to bed with a living child without any assistance, it will be usually found that, this time, the infant comes before term, or that it is less developed than usual. Premature artificial labor is then only an imitation of nature. Guided by this remark, I tried it for the first time in France, in 1831, with complete success.

Madame Tarlet, whom Désormeaux, M. Deneux, and myself were unable to deliver except by cephalotomy, in 1825, whom I have delivered twice since of dead children with the forceps or by version, and with whom another practitioner, M. Patrix, was not more successful in a fourth labor, experiencing some difficulty at the commencement of the eighth month of her fifth pregnancy, was induced to call me in. The circumstance seemed to me a fortunate one. I proceeded to separate and then to rupture the membranes. Labor, which was uncertain during the day, did not fairly come on until the third day. It was a pelvic presentation, the feet descended, and the head was brought down only by strong traction; but I delivered her of a living child.

Smellie reports a very nearly similar case. The sacro-pubic diameter measured only two inches and a half. The sixth child was delivered without assistance, because it was of eight months, and small.

MM. Riecke and Fodéré each mention a still more conclusive case, in which the women, who had always before been delivered with instruments,

delivered themselves without assistance by premature labor, and could not, in subsequent pregnancies, go to full term.

Premature labor, which Mai wishes to apply in case of the death of the fœtus, has not then the same advantage as under the foregoing circumstances, for on the one hand a dead child does not remain long in the uterus, unless as an exception, and on the other no operation should be practiced on the mother when it is slow in coming away. However, as the presence of a dead child in the womb exposes the mother to many dangers, and as a woman seen by me with Moreau died from it, I believe that it would be more prudent to provoke its expulsion, than to wait an indefinite time, as M. Froriep wishes.

We may also inquire whether the physician should not induce premature labor in women affected with chronic diseases, which pregnancy renders more and more dangerous, or which may terminate fatally before natural labor comes on.

Besides in cases of contracted pelvis, MM. Mai, Ritgen, and Carus recommend premature labor in prolonged pregnancies, when the children die *habitually* some time before term; in diseases brought on by pregnancy, which threaten the life of the mother, as metrorrhagia, retroversion (Lyne, Hunter); and in cases of ascites (Siebold). M. Costa did not think of it, except in diseases of the heart, when he consulted the Academy on this point. Siebold succeeded in this way in prolonging the life of an unfortunate woman afflicted with hydrothorax; and Ingleby believes, with Conquest, that it should be resorted to in cases of obstinate vomiting, and in extreme feebleness towards the close of pregnancy.

This is a delicate question, and should not be treated lightly. I will only say that it should be accomplished in all diseases which may hasten a fatal termination towards the close of gestation, as well as in hemorrhages and other accidents which occur before, or during labor. If it is admitted that we may aid the woman in the second case, I do not see why she should be left without assistance in the first. After premature labor, the child may live; but, if the mother dies before term, the fœtus almost always perishes at the same time.

A very advanced disease of the heart, hydrothorax, or ascites with grave organic lesion, an extensive gangrene without a line of demarkation, &c., may then justify provoked labor after seven and a half or eight months. M. Duclos tried it for a simple dropsy of the amnion; and how often is it put in practice in placenta prævia?

We should not run the risk of the delivery: 1st. When there exists some deformity, some alteration of the soft parts capable of presenting an obstacle to the escape of the fœtus, that is to say, when the contraction of the pelvis is not the only cause of the difficulty. 2d. If it can be perceived that the contracted strait is sensibly larger on one side than the other, and that if in the first delivery the occiput becomes engaged on the contracted side, and when it is then brought around in the opposite direction, it becomes enabled to pass. 3d. During the course of an acute disease. 4th. When the child presents unnaturally. 5th. When the fœtus is not viable, that is to say, before the end of the seventh month, or the twenty-eighth week. 6th. Without being sure of the dimensions of the pelvis, the period of gestation, and the true nature of the dangers which threaten the mother and the child, if the pregnancy should be allowed to proceed to its natural duration. 7th. Merriman, in fine, maintains that the operation should not be decided on unless other practitioners have seen the woman, and recognized its necessity.

C. Methods of Operating.—This operation already comprises four methods. The first consists in frictions and external manipulations, and scarcely ever succeeds, although M. d'Outrepoint says that it does.

The second, or that of Hamilton, which was adopted in the case mentioned by Riecke, is performed with the finger, or a blunt instrument, by the assistance

of which the ovum is separated from the walls of the uterus to the extent of about three inches around the neck, without penetrating the membranes.

In the third, the membranes must be pierced or torn, and the fourth is limited to the dilatation of the os uteri with a conical sponge. The two last processes only remain in practice. In the third, the desired effect is not always produced. In the case given by M. Riecke, it was necessary to resort to it three times—on the 3d of August, and on the 9th and 17th of September, 1823. The separation of the membranes will not suffice to bring into play the uterine contractions. The distension of the neck, being only momentary, succeeds but rarely in the first attempt. The dilatation with a piece of sponge, as devised by Kluge, is much more certain in its effects. The irritation which follows is permanent, progressive, regular, and it is kept in its place by a tampon, which is at the same time placed in the vagina. Under the influence of such an excitation, the uterus soon takes on action, and the labor occurs at once, and with sufficient rapidity.

The old method, which consists in opening the membranes, is accomplished in different ways: some, with Clarke, prefer evacuating the waters all at once; others, on the contrary, recommend, with Merriman, Salomon, and Fodéré, that they should pass off slowly. Different instruments have been proposed, from the time of Macaulay up to the present day. Mai used a canula and needle. Others employ a male sound moderately curved. M. Reisinger prefers a conical sound. Ritgen's instrument resembles *la sonde à dard de frère Come*. A sort of curved trocar, invented by Wenzel, and modified by Siebold, is now generally adopted in Germany; but all of this is of little consequence. The question is, whether it is better to empty the ovum slowly or quickly, and whether we shall distend the os uteri, or pierce the membranes. For my part, I think that, if we cannot put in practice the process of Kluge, there would be an advantage in imitating that of Clarke. By a simple puncture the space affected in the uterus would reduce it so little that scarcely any action would result. The fear of emptying the whole ovum has no foundation. However large the openings in the membranes may be, the waters only escape in part, while the contractions continue feeble, and so soon as they occur in their intensity, there is no longer any necessity for the foetus to be protected by the liquor amnii. Indeed, I have never seen any inconvenience result from commencing with the employment of the sponge and tampon. We thus give the uterus time to take on action without exposing the foetus to any risk, and nothing prevents us at a later period from rupturing the membranes if the labor does not soon take place, or if it progresses too slowly. The operation being once decided upon, the woman should be placed in the same position as for the touch, and we should endeavor to reach the os uteri with the index finger of one hand, while the other hand should press upon the hypogastrium; with a little patience, and some practice, we may always, or almost always, find it, pull it down, and even distend and enter it. Difficulties, doubtless, may be met with in first pregnancies, and still greater would be experienced if we have to deal with an abortion instead of a provoked labor; but there could be no very serious obstacle in this respect with a pregnant woman.

When the finger touches the naked membrane, a conical piece of prepared sponge, two or three inches in length, and from two to three lines thick at its point, enveloped with a piece of fine linen, greased with cerate, and having a strong thread run through its base, should be carried up. This should be thus pushed up at least half its length; then a piece of sponge as large as an egg should be placed in the vagina, just as if it were a tampon of flax, charpie, or linen. The whole should be supported on the outside with a T bandage, and the whole apparatus should be renewed at the end of twenty-four hours, if the labor does not come on. In the opposite case, it should be left until the uterine contractions become frank and strong. Afterwards we must proceed according to the indications in a common labor. If it becomes necessary to pierce the

membranes, and if the finger does not reach them, it serves also as a guide, whether for the conical sound employed for forced catheterism, or for a *sonde à dard*, or an ordinary grooved sound, or for a simple *mandrin*, or, in fine, for a needle or a trocar, enclosed in a canula, or even for a metallic rod of any kind; since it is never difficult to rupture the ovum without running a risk of severely injuring either the fœtus or the mother.

The instrument and finger being withdrawn, the operation is terminated, and we must wait for the occurrence of labor when the uterine contractions come on.

It is rare that the pains show themselves at once, or even at the end of some hours, but usually on the next day. Frequently they do not make their appearance frankly and without doubt, until the third or fourth day, and sometimes even the sixth or seventh. In Riecke's case, they did not come on until the eleventh. It is possible also that they may appear and last many days, to disappear afterwards all at once, and call for a new operation. Hamilton's method is especially exposed to these delays and uncertainties; that of Clarke is less subject to them.

A bath, a small bleeding, emollient or mucilaginous injections into the vagina before commencing, the usual attentions on the occurrence of the premature rupture of the membranes, and the precaution of having a wet-nurse ready in case the mother should have no milk, constitute all the special cares demanded for the premature accouchement. What I have said about the *secale cornutum* allows me to dispense with an examination as to how far it would be useful here.

D. *Statistical Recapitulation.*—To the authorities already cited in the course of this article in favor of the induction of labor, I can yet add that of Burns; of Gumprecht; of Merrem, who, in 1826, had four cases at the Clinic at Cologne; of Ciniselli, who mentions two instances, and who states that Lovati had already practiced it eight times at the Institute of Pavia; of Carus, who gives also an example; of Gregory, who records nineteen cases; of Nægèle, of Mende; of Bili, who tried it first at Milan; of Busch, and of many others of which the journals speak. Its only opponents remaining in Germany, are Bernstein; Stein, the younger; Jorg, Leighton, Osiander, and Wuisbet, who, after rejecting it, finally adopted it; and I dare say it will be the same in France in a few years.

P. Dubois, who wrote in 1834, found, then, but one hundred and twenty-seven examples collected by—first, Reisinger, seventy-four; secondly, Salomon, thirty-four; thirdly, Ferrario, six; fourthly, W. Campbell, two; fifthly, Mende, four; sixthly, Schow, four; seventhly, Ramsbotham, two; eighthly, Stoltz, one: but Schippan pretends that, from the time of Reisinger up to 1831, the operation has been practiced ninety times; that, out of this number, seventeen children were born dead; and that of the seventy-three others fifty-five continued to live. Seven of the women died.

Kilian found that the facts collected up to 1831 give one hundred and sixty-one operations, of which seventy-two were in England; seventy-nine in Germany; seven in Italy; and three in Holland.

Of these one hundred and sixty-one cases, forty-six children were still-born; and one hundred and fifteen living, of which seventy-three continued to live.

Eight of the women died, but five at least perished from diseases unconnected with the operation. Indeed, the editor of the *Gazette Médicale de Paris* adds that Stoltz has practiced premature delivery at Troyes, since the period of his lecture to the Academy, so that, at the present time, the science possesses at least one hundred and seventy examples.

ART. III.—OPERATIONS PERFORMED ON THE MOTHER.

§ 1. DEATH OF THE FŒTUS.

There is no doubt that the fœtus is still living if it moves, or if auscultation enables us to hear the movement of the heart; there is, also, no doubt of its being dead when portions evidently belonging to its structure, and in a state of putrefaction, escape from the organs; but with the exception of these cases, which leave not the slightest uncertainty upon the subject, the question of life or death is, here, one of the most delicate subjects in physiology, and one of the most difficult of solution of any in tokology. The same thing takes place in regard to the death of the fœtus as occurs in relation to the question of pregnancy; it is announced by numerous signs, but they are extremely variable and never certain. How could it be otherwise, inasmuch as it is sometimes impossible to pronounce upon the state of the fœtus that has just been born, and that is before our eyes?

A. *Signs*.—However it may be, the signs of death may be divided into rational and sensible, like those of gestation.

1. The *rational signs* are observed before or during labor.

a. *Previously to reaching the full term*, the woman has had a fall, or has made some violent movement or strong effort; she has struck her abdomen against some solid body; she has used too much ardor in coition; she has abandoned herself without reserve to vivid impressions of a moral kind; she has had a severe attack of disease, has taken very active medicines; in fine, she has exposed herself to some one of the causes that are capable of producing abortion; in which case there is some reason to presume that the child is dead—provided she should, shortly after the accident, have had rigors, nausea, a sense of weight above the middle of the pelvis, disgust, horripilations, or a sense of coldness in the belly. If the breasts are enlarged, full of milk, and then shrink; if the womb tends towards the lowest part of the body, and moves to the right, left, or in front, like an inert mass; if the fœtus has ceased to exert any active power; if the abdomen ceases to enlarge; if the mouth exhales a putrescent odor; if there is a general uneasiness, or a constant febrile state, as Maningham says, it is extremely probable that the fœtus is dead.

b. *During labor* the death of the fœtus is announced by the escape of the meconium; by the entire absence of motion; by a putrid odor that escapes from the vagina, or rather from the uterus, along with the waters; by the diminution of the labor pains; and by most of the phenomena which I mentioned just now. There is reason to fear it, especially, where the amniotic fluid has escaped prematurely, or at least where it has been long evacuated, and where the position is bad; or where the contractions of the womb have in any way borne directly upon the fœtus itself.

2. The *sensible signs* are not appreciable until some portion of the ovum itself can be touched with the finger. Among them are classed the premature descent of the cord, and the absence of its pulsation; inability to excite motion in the fœtus, although it be raised up in the womb; the escape of shreds of the cuticle; the want of a soft elastic tumor on the head; mobility of the cranial bones; the slight resistance offered to pressure by the thorax or any other part; the absence of pulsation in the heart, &c.

But it must be confessed that, perhaps, not one of these signs, taken singly, would be, to a prudent man, a sufficient warrant to pronounce unhesitatingly on the death of the fœtus; indeed, very few of them deserve much consideration. It is only when united, when constituting a whole, that we are sometimes warranted in drawing pretty rigorous conclusions. The swelling of the breasts, and their subsequent shrinking away, may occur, although the child continues to live; but this sign will, notwithstanding, be very important, if it coincides with a majority of the other rational signs, because, says M. Dubois, when the child

dies, its delivery, regarded as the completion of the great act of reproduction, is in some sort effected for the sake of the economy, and the secretion of milk tends to take place just as if the ovum were expelled. The same may be said as to the disagreeable load felt by the woman in all her movements, and the sense of weight which she experiences in the bottom of the pelvis.

The waters may have been evacuated for three, four, ten, fifteen, thirty, and even fifty-seven days, according to Bauhin, Boer, and M. Morlanne, without being necessarily followed by the death of the fœtus; but the contrary will, however, much more commonly be met with. If the meconium escapes, and the pelvis is not the presenting part, there is great reason to fear that it is dead, although more than one case has been seen where, under such circumstances, the fœtus has been born after several hours, strong and healthy. When the breech comes down first, there is nothing unnatural in the discharge of the meconium which is occasioned by the pressure experienced by the belly as it passes through the os uteri, or the straits; it is altogether a mechanical effect. But when the head is the presenting part, the same cause no longer exists, and, in general, the bowels are not evacuated, unless the sphincters, by being weakened, like the other muscles, relax so as to oppose no resistance to the action of the womb, which will scarcely take place unless the child is near expiring. If Viardel, who was the first to insist on the escape of the meconium as a sign of the death of the child, had pointed out this difference, he never would have been so severely handled by Mauriceau and Peü. Lastly, the practitioner ought not on this subject to let himself be imposed on by the muddy appearance or greenish color of the waters; for this is an appearance often assumed by them without the meconium having anything to do with it.

A living fœtus sometimes suddenly ceases to move altogether, and may remain several days or weeks, or indeed until its birth, without moving, and yet may not have incurred any danger. In one case it did not move for two days; both mother and midwife thought it dead, and Deventer and his wife were of this opinion. Besides, it was extracted roughly, yet lived forty-eight hours, says the celebrated Hollander. In the case reported by Smellie, it did not move at all during pregnancy. De la Motte cites a similar case, and remarks that the child was very strong. On the other hand, the woman often supposes she feels it move after it has really been dead for a long time, and I could relate many cases of the kind, one of which I very lately saw with Dr. Leseble, in a young woman who gave birth to a child that had been dead at least four or five days, although she told us an hour before the delivery that she felt it move. But this does not prevent the sign from being a very important one to the practitioner who knows how to estimate it; and when, in the course of a long and difficult labor, the motions of the child are found suddenly to cease after having been felt with more or less violence, and, as it were, convulsively, there is good reason to fear for its safety.

Portions of the epidermis, and some of the hair, might, indeed, become detached from some inflamed, gangrenous, or ulcerated point, without the child being dead. M. Orme reports a remarkable case of it. If this sign depended upon putrefaction, it could in no case occur until after life had long ceased. In fine, I can scarcely believe that any one could be deceived who should pay a careful attention to all the circumstances.*

The odor that escapes from the vagina has always seemed to me to have but little significancy, as long as the membranes are unruptured; but after that, I

* Yet Baudelocque was near being deceived by such a symptom; he was on the point of using the perforator, because a sloughing tumor on the scalp gave him this very reason to suppose the fœtus dead. By a sort of miracle of good fortune, he was induced to lay aside the perforator, and resort to the forceps, with which he delivered the woman of the child in perfect health, with the exception of the gangrenous portion of the scalp.—M.

regard it as one of the most certain signs. It incontestably depends on the circumstance that the air, by gaining access to the uterine cavity while at a high temperature, under the influence of the uterine contractions, actively promotes the putrefaction of the liquids still remaining within the membranes. This odor at times is rapidly manifested, and may, in the course of a few hours, become almost insupportable. It would be difficult to confound it with any other odor, such, for example, as that exhaled from an ulcer, or a suppurating surface of any kind, and up to the present time I have never met with it where the child did not afterwards come dead into the world. M. Nægele has, however, reported several cases in which the fœtus continued to live although the waters were dark and fetid, and the epidermis detached, and the cord and membranes of a greenish yellow. M. Heischemann speaks also of a child which cried and breathed for half an hour, although it presented every sign of putrefaction.

As to the swelling of the hairy scalp, since it is produced by the accumulation of fluids beyond the point of the head, which is strictured more or less violently and for a longer or shorter period by the os uteri, or the strait of the pelvis, it is evident that it will not form, provided the child should be dead previously to the rupture of the membranes; but, if the child should not die until after its formation, it might then continue, just as if death had not taken place. I do not speak of the overlapping and movableness of the cranial bones, because they may too easily lead us into error, and also because these two phenomena may depend upon causes far too diverse.

Where it is possible to reach the umbilical cord, we can easily determine whether it continues to pulsate or not; and I cannot readily conceive how this sign could deceive a well-informed practitioner as to the real state of the child; I know that the vessels of the cord may suspend their pulsations, during each effort made by the womb or by the mother, without the fœtus really running any great risks; but we should not decide upon the child's death simply because we have examined the cord during the presence of a pain, or because we have for a moment felt it to be without pulsation. It is only after having satisfied himself that the pulsation is entirely abolished for several minutes, and equally during the presence and the absence of the pains, below, as well as above the head, either free or compressed, that the accoucheur is at liberty to pronounce without fear upon the state of the fœtus. To be still more certain, if the head has not cleared the superior strait, I cannot see why the hand might not be passed up more or less into the womb, so as to ascertain whether the heart continues to beat, and to touch the umbilical cord nearer its root, or at some point where it should be free from all compression.

If then the combination of all these signs, or the chief of them, were always to be met with where the child is dead, there will rarely be any embarrassment in giving a decision; but they fail so often when it is indispensable to proceed to action, when there is no time for temporizing, that it is easy to imagine how practitioners have been led to the performance of serious and even mortal operations on the mother, although the child was actually dead; and how, at other times, the child has been cut to pieces while still full of life.

Hitherto, medical men have made only vain efforts to escape from so distressing a position, and may God grant that the method lately proposed by MM. Bermond, Baudelocque, Jr., and Toirac, may not deceive the expectations of its inventors. These three physicians seem to have thought, at the same time, and without each other's knowledge, that, by bringing the two extremes of an electric circle, in the womb, in contact with some given part of the child, or merely upon the belly, its muscular contractions would necessarily be brought into play, provided it were not dead. It is a fact that both reason and analogy are in favor of this idea; but upon so difficult and serious a subject we ought to wait for a longer experience, and not pronounce lightly.

B. *The fetus is alive*, and, to keep it so, we have either to enlarge the openings through which it has to pass, or make new ones. At the commencement of the last century, even when accoucheurs met with a case of the pelvis so deformed as to render delivery impossible, they preferred to sacrifice the child rather than perform any operation upon the mother. Some of the boldest of them, like Mauriceau, had immediate recourse to embryotomy, or at least to cephalotomy; while others, as De la Motte, being more timid, and more humane, in appearance, but in reality more barbarous, patiently waited until the child was dead before they would proceed to cut it to pieces. At the present day, inasmuch as symphyseotomy and the Cæsarian operation have been successfully performed a great many times, the operation of embryotomy is not admissible until everything announces that the fetus is dead, or that it cannot live.

§ 2. OF SYMPHYSEOTOMY.

A. *History*.—Being persuaded that the articulations and even the bones of the pelvis were capable of being softened during pregnancy, Eernel, S. Pineau, and many other old writers, conceived that it would be useful to favor their softening, in cases of contracted pelvis, and that this might be effected by means of embrocations, cataplasms, and topical or general bathing. Founding their opinion upon these vulgar traditions, which are spoken of by Riolan and Paré, and which induced the common people to believe that in many countries there is a practice of breaking the os pubis in young girls as soon as they are born, for the purpose of rendering child-birth more easy for them; and upon what Galen, in speaking of the pelvis, says, viz., *non tantùm dilatari, sed et secari tutò possunt, ut internis succurratur*, some modern physicians have supposed that the operation of symphyseotomy must have been conceived of in the remotest antiquity. It is true that Cl. Delacourvée mentions a deformed woman who died previously to delivery, and in whom, after death, he divided the symphysis pubis for the purpose of enlarging the pelvis. Plenck acted in the same manner in 1766 upon another subject; but it is proper also to state that no one, not even Sylvius, notwithstanding what Lauerjat says, had absolutely thought of proposing the performance of this operation in the living subject with the view of facilitating delivery, when Sigault, who was still a medical student, made it the subject of a memoir, which he presented to the Academy of Surgery in 1768.

The idea of symphyseotomy is, therefore, really due to this surgeon. The Academy was hardly willing to hear the first proposal of it, and Louis, who communicated it to Camper, treated it as a ridiculous project, engendered in a young brain that was as yet incapable of any reflection. Blumenbach, who questions the separation of the symphysis during pregnancy, says that the mobility of the pelvis which is observed at this time depends on the relaxation of the soft parts, and Rœderer himself maintained that the bones of the head are too soft to separate the pelvis during labor. But not so the celebrated Hollander, who, after performing several experiments upon the dead subject, replied, to the secretary of the Academy, that at some future day it might be advantageously resorted to. On his part, Sigault was not disconcerted, and reiterated the same idea in his thesis at the school of Angers in 1773. Four years afterwards, he performed his operation, in presence of A. Leroy, upon a woman named Souchet, and was so fortunate as to save both the mother and the child. This success gave rise to an extraordinary degree of enthusiasm; the hundred tongues of fame seemed insufficient to celebrate the glory of the author of so brilliant a discovery. The Faculty of Medicine at Paris thought they could not reward him too highly by passing a solemn decree, and causing a medal to be struck in honor of him; so that this same Sigault, whom the Academy of Surgery would not deign to hear a few years before, was soon proclaimed the greatest of benefactors to humanity.

Such exaggeration as this soon gave rise to a lively opposition amongst the surgeons, and was the signal of a combat, in which a great number of the medical men of different countries felt themselves called on to take a part. The Academy of Medicine warmly supported the opinions of Sigault; the Academy of Surgery, as much perhaps out of spite for not having retained them in its own bosom as from conviction, continued to reject them with no less ardor. Both parties were unjust: the dispute became scandalous; libels were published, personalities were not spared, and being divided into *Symphysians* and *Cæsarians*, as they were then called, the accoucheurs, actuated by inveterate hostility to each other, were not ashamed to keep up this controversy, equally curious and extraordinary, until the commencement of the present century, without coming to an understanding. Plenck, Siebold, A. Leroy, Baudelocque, Saccombe, Giraud, and Ansiaux descended into the arena, but without perceiving that the question was ill stated.

Sigault, in fact, was wrong to propose symphyseotomy as a substitute for the Cæsarian operation. Giraud, in maintaining the latter to be preferable to it, in case of exostosis at the superior strait, and when the sacro-pubal diameter is scarcely an inch, seemed as extravagant as Bodin, who thinks symphyseotomy useless. Everybody would have been on his side, had he only proposed it as a new resource, fit to enrich the art, an operation attended with its own peculiar applications, advantages, and dangers, and which at least renders cephalotomy and the Cæsarian operation more rarely indispensable. Weidemann and Desgranges were the first to view it in this light, and, by imitating them, Thouret and M. Gardien have at last put an end to these disgusting polemics, which served as an excuse and screen for the jealousy and envious rivalry of all the little spirits of the period to blacken the fame of a great many most respectable men.

But at the present day, when all the passions awakened on the occasion of this quarrel have become extinct, it is an easy matter to estimate the operation of symphyseotomy at its just value. The rupture of the symphyses during labor, of which Smellie, MM. Ansiaux, Ristelhueber, and Bach speak, the numerous cases of relaxation or separation which authors at all times have referred to, and which I have mentioned when treating of pregnancy, and what Pielt, Chaussier, and M. Murat say about it, show us precisely what can be expected from such an operation.

B. Mechanism.—When the inter-pubal fibro-cartilage is divided either after death or on the living subject, the bones generally separate about one inch, of their own accord. When the cartilage is divided, the coxal bone somewhat resembles a lever of the first kind; the centre of motion is found at the posterior part of the articular facette of the sacrum; the posterior branch of this lever, very short, and formed by the tuberosity of the ilium, is drawn backwards and towards the median line by the posterior sacro-iliac ligaments; its anterior branch, which is very much bent (*coudée*), separates (from the corresponding pubis), in proportion to its excess of length over the branch, which represents the power; the fore part of each posterior symphysis becomes somewhat open; the fibrous tissue which covers them yields, is elongated, stretched, and detached; the elastic cushion which is behind them becomes relaxed; and the sacrum, compressed from behind forwards, tends to escape towards the interior of the pelvis, whose superior strait, says Delpach, represents very nearly a triangle with its hypothenuse behind. When the surgeon adds still more to the separation of the pubes by pressing upon the crista of the ileum, the power is transferred to the anterior branch of the lever, and it is evident that thenceforth no very violent effort would be required to tear away all the bonds of the posterior articulations. This is the situation particularly where the displacement of the sacrum in front must cause the increase of the length of the antero-posterior diameter to disappear as fast as it tends to take place. In the empty pelvis and upon pieces of paper, this is really the case; but in the living subject, while the pubes are

separating, the child's head pushes the sacrum backwards, beyond its natural limits, rather than admits of its advancing into the excavation. Nevertheless, it would, in most women, be dangerous to separate the ossa pubis from each other more than one or two inches: we could not go beyond that without lacerating the loose and abundant cellular tissue of the excavation, the anterior sacro-iliac ligaments, and part of the posterior ones, without giving rise to the most violent pain, and causing the most redoubtable inflammation, unless the symphyses should happen to be already very much softened beforehand, under which circumstance it is not likely that symphyseotomy would ever be required.

Since you agree, say the antagonists of the operation, on the one hand, that it is not prudent to attempt a greater degree of separation than two inches or two inches and a half; and, on the other, that the antero-posterior diameter is never enlarged more than two lines for one inch, four lines for two inches, and six or eight lines for three inches* of separation, it is manifest that you can depend upon only three or four lines of *ampliation* of the pelvis: now, is it right that we should perform so serious an operation for the purpose of gaining only three lines, and perhaps not more than two? This argument at first seemed almost unanswerable. Then it was said in reply: Doubtless we obtain an elongation of only three lines for the antero-posterior diameter; but, by engaging in the void space between the separate pubes, the parietal protuberance or projecting part of the occiput will abstract at least three or four lines from the diameters of the head, so that we gain at least half an inch. In speaking after this fashion, authors have forgotten that the occiput or the parietal protuberance is commonly found behind the body of the pubis or acetabulum, and not behind the posterior face of the symphysis. But, further, this last disposition, in its turn, gives great advantages in the operation, and I am astonished that authors have scarcely mentioned it. I mean that, if the antero-posterior diameter is augmented only two or three lines, the oblique ones will be increased by at least six lines; and as the occipito-frontal and bi-parietal diameters are not directed from front to rear, but obliquely, it follows, in fact, that the section of the symphysis appears to be less limited in its applicability than has been generally imagined. The researches of M. Desgranges prove that it permits the oblique and transverse diameters of the pelvis to enlarge to the extent of near an inch; that at the inferior strait particularly, it would procure a considerable ampliation, and that upon this subject there is, in my opinion, a want of some additional experiments. Ansiaux, who accuses Baudelocque of inaccuracy with regard to the *clinique* at Liege, and who relates the instance of a case of symphyseotomy performed at the *Maternité* in that town in 1823, has given his experience on other occasions, the results of which are more favorable than had been anticipated. Three inches of separation afforded him ten lines. In a pelvis of two inches and one line, one inch gave him two and a half lines, two and a half inches afforded him seven lines, and three inches nine and a half lines. In another pelvis, he obtained three lines for one inch, six for two inches, and ten lines for three inches. However, it would be erroneous to believe, with Petruni, that we can in this manner obtain an increase of as much as an inch and a half in all the diameters of the superior strait.

C. *Advantages and Disadvantages*.—The operation of symphyseotomy, therefore, seems to be applicable in all cases where an increase of space to the amount of four, five, or six lines would permit the head to pass; for example, in all cases where the forceps is insufficient, and where, nevertheless, the smallest diameter of the strait exceeds two inches and a half. But, as it is seldom possible, in the living subject, to ascertain how far the head is susceptible of reduc-

* Boer even asserts that, when carried to the extreme, this separation can never give more than three lines additional to the antero-posterior diameter.

tion under pressure, and whether the strait is two inches and eight lines rather than two inches and a half, it has happened that the accoucheur, finding a difficulty in marking the point where the section of the pubis becomes indispensable, and that where it can no longer suffice, has generally decided in favor of the Cæsarian operation, whenever the absolute necessity of doing something to save the child's life has been ascertained. As to the dangers of the operation, it appears to me difficult to prevent them, where the volume of the head requires a considerable separation of the pubes, and wherever the pelvic articulations are naturally very little relaxed. Even could we dispense with acting on the hips or thighs, the child nevertheless must pass through, and, whether we extract it with the forceps or by turning, or whether the contractions suffice for its expulsion, nothing seems able to hinder the head, as it passes through the contracted strait, from violently distending the posterior articulations, and even lacerating them if its dimensions exceed those of the circle through which it must traverse.

I am, however, far from thinking, along with Denman, Lauverjat, Hunter, Osborn, and Dr. Dewees, that it ought to be rejected in all cases. If Mr. Burns found no other case of it except that of Welchman, M. Giraud says he saw it performed at Lyons, and the report of the Medical Society of Metz shows that M. Stock recently tried it with success. M. Petrunti has also added another case to those already in his possession. If the woman Vespres, operated on by Sigault, contrary to the opinion of Lauverjat and Coutouly, died as well as her child, it was because the sacro-pubal diameter was only two inches, and the operation was not suitable. If Lauverjat is often right in his diatribe against Sigault, still the latter proves that, of the four women operated on by him at Paris, three were cured, whereas, in the provinces, seven in eight were saved, and that Madame Laforest, of Gobelins, walked fifteen days after the operation. It can be seen, in the work of M. Ansiaux, that Cambon, of Mons, has performed it three times successfully. I merely wish to show that its partisans, in their representations, have singularly lessened its dangers, and exaggerated its advantages. Notwithstanding the late reasons advanced by M. Ansiaux, and the censure he has cast upon me in relation to this matter, I cannot agree with this author, for example, that it should be preferred to cephalotomy even when the fetus is dead.

It is the only means of safety that can be resorted to: 1. Where the head is locked in the excavation, after having passed through a very contracted superior strait. 2. Where the head has cleared the os uteri, and is arrested by the narrowness of the inferior strait. 3. Where the trunk is delivered, the life of the child unquestionable, and it is impossible for the head to get through the natural passages. In these three cases, it is preferable to the Cæsarian operation, even after the death of the woman; and that, because it would be almost impossible to avoid killing the child by attempting to extract it by the abdominal opening.

Further, it offers unquestionable advantages wherever the contraction affects the transverse and oblique diameters; where it exists as the inferior strait; when it depends on *barrure*, an exostosis, any solid tumor situated laterally, or on a protuberance of the acetabulum. The same holds good of locked head, whether of the species called by Roederer *paragomphosis*, or whether the head is pinched at the two extremities of its bi-parietal or occipito-frontal diameter, or in any other way that prevents it from descending, and from being easily pushed upwards; and, lastly, whether this locked head be understood after the manner of Baudelocque, of Madame Lachapelle, or of M. Désormeaux, provided always that the inferior strait be not extremely contracted. It is manifest, further, that, if the elongation of the sacro-pubic diameter, produced by the section of the pubes, must be so much the greater in proportion as the contraction of the pelvis is so much the more considerable, as maintained by Giraud and Ansiaux, the very

contrary may also happen, as has been well observed by Boer and by Madame Lachapelle.

To perform this operation, it is necessary : 1. That the fœtus shall be living ; for, notwithstanding what M. Gardien says, where symphyseotomy is indicated, should the child be dead, we ought to prefer the operation of cephalotomy, which would always suffice in that case. 2. That the presentations shall be natural, and that, as far as possible, we shall not be compelled to extract the fœtus by the feet, because turning too frequently occasions its death. 3. That the os uteri shall be largely dilated : for otherwise there could be no certainty that the operation is indispensable, and, moreover, we might, after performing it, find it impossible to terminate the delivery with the necessary rapidity. 4. That the woman shall be young enough to obviate all fears in relation to anchylosis of the pelvis.

D. Manner of Operating.—The patient, being placed upon an operation table, or on the bed, in the same manner as for the application of the forceps, having her thighs and legs slightly flexed, and properly separated, an assistant must hold her shoulders, and two others take charge of her knees, while a fourth stretches the skin of the belly, and a fifth is prepared to hand the operator whatever may be required.

Situated to the right or betwixt the legs of the patient, the surgeon, with a convex and very sharp bistoury, makes an incision, which should commence a little above the symphysis and extend close to the clitoris ; this incision divides the skin, previously shaved, and all the soft parts that compose the mons veneris ; being parallel to the median line, it ought to fall as nearly as possible upon the centre of the articulation ; at its lower part, however, it is well to give it a slight inclination to one side, between the top of the greater and lesser labium, and even to separate one of the roots of the clitoris from the ramus of the pubis, for the purpose of avoiding dangerous lacerations at a later stage of the process. There can be none but very small arteries to tie, unless the internal pudic should be divided by incautiously carrying the incision too far downwards. For the purpose of dividing the cartilage, some have recommended that we should act from below upwards, others from above downwards, and several from behind forwards, or from within outwards, and most writers from before backwards. There are some who have made use of a bistoury, a sort of scalpel *en rondache*, of the pliable knife of Aitken, of a probe-pointed bistoury, or a common bistoury, the point of which M. Gardien recommends to be covered by the point of the nail of the left forefinger, so as to prevent any injury to the internal organs. In such a case every man ought to be allowed to choose the instrument that pleases him best. For my own part, I think that in this, as in other cases, regard is rather to be paid to the hand that acts than to the shape of the bistoury, and that the only essential qualities of the operating knife are strength and sharpness. The safest way is to cut the symphysis from above downwards, and from the cutaneous surface to the pelvic surface of the symphysis. The incision ought to be extended upwards half an inch, or even a whole inch, along the linea alba. To avoid the risk of wounding the bladder, or urethra, as has happened with some surgeons who went at one stroke quite to the head of the child, through the bladder and womb, I think it will always suffice to hold the blade of the bistoury at some distance from its point with the left finger and thumb, while we make its cutting edge act with the right hand : with the view of still more certainly avoiding the bladder and urethra, the catheter should be introduced early, or at least previously to commencing the second stage of the operation. By this means the bladder is emptied, and the catheter serves to push the urethra a little to the right, while the incision is inclined slightly to the left side of the sub-pubal ligament. When the ligamentous matter is almost divided, the precautions are to be redoubled ; the cutting should now be done almost wholly by

touches with the point of the knife, and it is to be laid aside as soon as we find no more resisting and elastic material to divide.

Frightened with the imaginary disorders which might be produced by the access of the air into the articulation, Alphonse Leroy advised that the operation should be divided into two stages. For that end M. Lescure, his pupil, thinks that an incision of nine or ten lines should first be made through the skin, then, after having divided one-third of the cartilage with extreme gentleness, that we should return and prolong the section of the ligaments as far as the clitoris, and afterwards proceed to divide the remainder of the cartilage. "Without minding the blood that escapes from the small external pudic vessels; this section is performed," says he, "very slowly, and by carefully feeling the cartilage."

Others have supposed they could more certainly attain the same end, by dividing the skin only above and below the symphysis, or, even only to the extent of a few lines opposite its middle portion, which would surely render the section of the ligament very difficult; but at the present day these ill-founded fears are dismissed: it is universally known that the accidents that too often follow the operation of symphyseotomy are unconnected with the action of the air upon the cartilage; and further, that such modifications in the mode of conducting the operation would in no wise prevent it.

Previously to commencing, it is important to make sure of the spot occupied by the articulation; for, when the pelvis is deformed, it is not uncommon to find it deviated so far to one side that the operator has on more than one occasion fallen on the body of the bone, instead of uncovering the cartilage itself.

Should it happen that the symphysis is found ossified, as in the pelvis mentioned by Weidemann and Lauverjat, and as Boer and Madame Lachapelle inform us is often the case, there would be so small a chance of obtaining even a tolerably large opening, that, instead of sawing the articulation, as was done by Siebold, I should prefer to have recourse to the Cæsarian operation. By applying the saw beyond the symphysis, upon the very body of the bone, according to the counsel of M. Desgranges, the operation would not be rendered either more or less dangerous; for the difficulty exists behind, in the sacro-iliac articulations, and not in front.

Immediately subsequent to the division of the cartilage, the posterior branch of the bent lever, formed by the coxal bone, being acted on by the elasticity of the posterior sacro-iliac ligaments, occasions a separation of from six to twelve lines between the pubes. This separation must necessarily vary, according to the degree of contraction of the pelvis, and the rigidity or softness of the symphyses: if it is sometimes effected in equal proportions by both of the bones, there must also be cases where one is much more concerned in it than the other. Be this as it may, I find it difficult to understand how it can go, spontaneously, to such an extent as to prove dangerous, or that it is worth while to restrain it by securing the hips previously to the conclusion of the operation. On the contrary, to carry it to a sufficient extent, it is almost always requisite slowly and moderately to press the hips from within outwards, and from before backwards, or carefully to separate the woman's thighs. This, however, does not in any way render the pincers necessary which Bouillet and A. Baudelocque insist upon, and which they introduce closed between the bones for the purpose of separating them by opening the instrument.

Unhappily, when the operation is terminated, the delivery is still far off. If the contractions are energetic and well sustained, the delivery is entrusted to the natural powers, to which also it would doubtless be better to refer the care of separating the divided symphysis to the required extent; but if the womb does not react, if the labor grows languid, or any circumstance arises demanding the prompt extraction of the fœtus, we are obliged to apply the forceps, or turn the child, and that conformably to the principles that have already been laid down;

remembering, further, that turning causes the child to incur the greatest risks, and that it was for the preservation of its life that the mother was subjected to the section of the pubis.

I should so greatly fear to bring down the feet in such a case that, unless they had originally presented, I would without hesitation give the ergot to excite the uterine contractions, and would attempt the employment of the forceps, even should the head, still engaged in the superior strait, be found to be situated transversely. During this part of the operation, it would probably be necessary to support the hips or whole pelvis, either with the hands or a suitable bandage, so as to prevent the articulations from being too much lacerated by the eccentric pressure of the foetal head or the efforts of the accoucheur.

E. Dressing.—When the delivery is complete, the woman is to be cleansed; the pubes are brought into contact with each other; some lint, spread with cerate, and some compresses are to be placed over the womb; a body bandage passed round the pelvis keeps everything in place, and should be sufficiently tight to prevent, at least to a certain extent, a new separation of the bones from taking place; the patient, being now put to bed, ought to lie on her back, and be kept in a state of the most perfect rest; her thighs especially ought not to move for six weeks or two months, a period of time which is indispensably necessary for the consolidation of the symphysis; she is also to be kept upon the regimen proper in serious operations, and if any accidents make their appearance they must be vigorously combated.

The discharge of the lochia must be carefully attended to, and if they threaten to disappear too soon, emollient or detergent injections should be thrown into the vagina, and the woman should be advised, if she can, to suckle the child, and care must be taken to preserve the lips of the wound in constant contact. When the term of cure approaches, motion, and particularly walking, should not be allowed except with great reserve. Should there still remain any mobility and pain in the pelvis, recourse must again be had to rest for a longer or shorter period, and it often happens that walking and standing cannot be permitted without danger for three or four months. If it is difficult to understand how Madame Laforest, of whom Sigault speaks, could walk the fifteenth day, it is still more so to explain how the woman of St. Leon, operated on by Desprès, was able to rise and seat herself near the fire the third day after the operation.

Doubtless, nothing can be more desirable than the consolidation of the divided symphysis; but there have been women in whom it could not be obtained, and who were, notwithstanding, able to walk, stand, and leap, without sensible inconvenience, which is to be explained upon the supposition that the posterior symphyses had acquired a great degree of firmness. MM. Mansuy and Dubois have each related a case of this sort. A. Leroy and M. Lesclapart even go so far as to say that it ought to be promoted by omitting any bandage round the pelvis; they say, and perhaps they are not wholly wrong, that the space between the symphysis fills with a cellulo-fibrous tissue, which does not prevent the articulation from being firm, and also allows the woman to bear children subsequently with much greater facility.

F. Results.—Upon the whole, when we consider that out of forty-four women who have undergone the operation of symphyseotomy, fourteen died; that several remained crippled for life, particularly the two spoken of by Madame Lachapelle, and who were operated on at the *Maternité*; that in some of them the operation was not indispensably necessary—since, as, for example, in the case of La Dubelloy, the delivery was effected six times without assistance, and the woman of Saint Omer had three living children; and since the woman Blandin, who was operated on once by Sigault, and who was unwilling to be operated on a second time, was delivered of a living child by a midwife, and that it was the same with the person first operated on by Desprès; that they were afterwards delivered

without assistance or difficulty; that most frequently the child has not been saved, and that, in fact, it must, in a majority of cases, perish under the operation of turning or the forceps, which we are almost always obliged to try; lastly, as observed by Lauverjat, that, in eighteen operations, twenty-one individuals, mothers or children, perished; that in two cases it was found necessary to have recourse to the Cæsarian operation; that five were followed by incontinence of urine, and one by claudication; that in the thirty-four cases mentioned by Baudelocque, only eleven children were saved: when we consider, I say, all these dangers, and compare them with the advantages derived from it in the most successful cases, it is difficult not to concur with M. Désormeaux in regarding the section of the symphysis as being in fact scarcely less serious than the Cæsarian operation, and that its employment ought to be restricted within pretty narrow limits. In the first place, the forceps; in the second, hastened delivery; and in the third, the *secale cornutum*; and, finally, if the *foetus* be dead, the *cephalotribe* of Baudelocque will, it must be confessed, render its necessity more and more rare, and will enable us to understand how it is that M. Ritgen is the only accoucheur in Germany who still recommends it.

G. *Catolica's Operation*.—If I understand correctly what was told me by Professor Vulpès, it would appear that Dr. Catolica, of Naples, had substituted another operation for that of symphyseotomy, which, properly speaking, is but a modification of the one already proposed by M. Desgranges of Lyons, and M. Champion. Instead of dividing the cartilage, he proposes that the body and ramus of the pubis, on each side, should be divided between the two oval foramina, as was recommended by Aitken. In this way, the sacro-iliac symphyses remain uninjured; no risk of wounding the bladder or urethra is incurred; the cellular tissue of the pelvis is scarcely stretched, and the consolidation is easily obtained; there is no fear of abscess, caries, fistulæ, claudication, or peritonitis, and a considerable ampliation of the sacro-pubic diameter is obtained.

This operation, which Pitois has made the subject of a very good thesis, has been since claimed, though improperly, by Galbiati. Aitken, who wrote in 1785, describes it exactly as I have done. It may even be stated that the articulated saw which he used, and of which he has given a figure, differs scarcely at all from the chain-saw of Jeffrey recently introduced into surgical practice. I will add that M. Vulpès told me that he took the memoir of Catolica in 1826 to the *Académie Royale* of Paris, and that it was not Galbiati himself who claimed it. I will also add that Catolica does not appear to have followed this process in the case of symphyseotomy which he practiced in 1829, and which resulted in the death of the mother and child. However, it should be said that Galbiati seems to have been the first to practice bi-pubiotomy (he calls it *pelviotomy* as Aitken does, and attributes it to *Haytren*) during life. It was on a woman afflicted with rachitis that he made the division of one side, and then performed symphyseotomy properly speaking, and immediately administered ergot. Twenty-four hours afterwards he sawed the other side. Death took place next day, when he found a kind of gangrenous matter in the pelvis, but no peritonitis. (*Hopital des Incurables à Naples*.) It follows from this that the process of Galbiati, described by this surgeon in 1819, is not the same as that of Aitken or Catolica, and that neither the one nor the other will probably become applicable to pregnant women who are deformed.

§ 3. OF THE CÆSARIAN OPERATION.

The denomination of Cæsarian section is given to an opening made into the belly and womb for the purpose of extracting the *foetus* when it cannot be delivered through the natural passages. Since the time of Simon, its application has been further extended to the incision or incisions which it is sometimes ne-

cessary to make in the cervix of the uterus, with the view of facilitating the passage of the head through it.

A. *Abdominal Hysterotomy*. 1. *History*.—Being lost, as it were, in the night of time, the origin of this operation has not as yet been precisely ascertained by any one. In the fabulous ages, it was said that Bacchus, the son of Jupiter, was extracted from the belly of Sémélé by Mercury. The Romans made the same statement concerning Esculapius, who was extracted from the belly of his mother by Apollo, after she had been already placed on the funeral pile destined to consume her. Virgil also says that Lycus came into the world in the same manner. These vague traditions, a passage in Pliny, and certain Roman laws, induce a belief that the Cæsarian operation must have been employed in the most remote ages. M. Mansfield, in a work, an extract of which is contained in the *Bulletin des Sciences Médicales*, attempts to prove that it was practiced even by the Jews. It is said, in the Talmud and the Mischajoth, that a child born by the section of the belly has not the rights of primogeniture. Jaschi has described it in his commentary on the *Nidda*, and says that women who have undergone it are not compelled to perform the forty days purification. There is, however, no certain proof that it was performed upon a living woman anteriorly to the year 1520, unless we admit as authentic the case of the lady at Craon, who, according to the statement of Goulin, was subjected to the section of the belly in 1424, and, as well as her child, survived the operation. The ancient Greek and Latin physicians make no mention of it whatever. Guy de Chauliac, who seems to have first described it, founding his opinion upon the following passage of Pliny (*Auspiciatus, enectâ parente, gignuntur, sicut Scipio Africanus prior natus, primusque Cæsus, Cæso matris utero, dictus, quâ de causâ, Cæsones appellati; simili modo natus est Manlius qui Carthaginem cum exercitu intravit*), believes that it took its name from Julius Cæsar; others, on the contrary, think that the general and his family took their name from the operation. Bayle remarks that Aurelia, the mother of Cæsar, was still living when he went to Britain, and consequently that the story related by Pliny ought to be rejected as fabulous. The researches of Weidemann and those of Sprengel having given no satisfactory solution of this problem, we are obliged to confess that the etymology of the Cæsarian operation is no better known than its origin.

2. *Appreciation*.—Rousset was the first author who dared to maintain that it may and ought to be had recourse to in the living subject. After having cited various experiments and numerous analogies, he mentions seven women who had been subjected to the Cæsarian operation with complete success. But can we rely upon the authenticity of the case of the woman named Godon, who was operated upon seven times; upon that spoken of by the surgeons Lenoir and Lebrun, who operated upon the same subject three times; upon the recital of Alibax of Sens, of Colot, or the story of the woman who had a long scar upon the right side of the belly, and who said she had a child extracted through the part seven years before? Ought we to receive, according to the very letter, what G. Bauhin says of the person called Alipaschie of Siegershensen in Germany, who was operated upon by J. Nufer, a spayer of cattle, after she was given over by several midwives, and who recovered so happily that several years afterwards she was delivered, without danger, of two other children? What are we to think of the other fact mentioned by Paré and Schenck relative to Nicola Béranget? How happened it that this woman was delivered two years afterwards of a girl, and subsequently of a boy, if there was any necessity for her to undergo the Cæsarian operation? The same may be said of the case of Elizabeth Turgois, who subsequently gave birth to four children by the natural passages, according to the report of the same Bauhin. In fine, it is certain that, in the sixty odd cases related by Rousset, Bauhin, and Simon, there is but a very small number which are altogether conclusive, and that Paré, who believed a little in its success, after-

wards retracted all that he had said in its favor; that Guillemot, who practiced it twice, and had seen it performed three times by Viart, Brunet, and Charbonnet, without success; that Marchant and Mauriceau, who regarded success as impossible, *as many impostors have said*; that Peu, who has never done it, and never desired to do it; that Dionis, who wishes he could punish those who practice it on the living woman; that De la Motte, who reports, however, a successful case by a surgeon of Pont L'Abbé, and all those who are not willing to be convinced merely by unsuccessful cases, are not wanting in excellent reasons to dispute the assertions of Rousset, as Deventer is not wanting in ability to defend them.

Be this as it may, according to Baudeloque himself, the Cæsarian section has been often performed with success. Of ninety-three cases, he counts thirty-three successful examples, twenty-four since 1750. Without counting the two cases of Lauverjat, those of Sanson, of Bourret, the two cases of the surgeon D' Attichi, those of Brou, of Soumain, of Deleurye, of Chabrol, of Millot, which appear incontestable, it has been practiced twice at Nantes on the same woman by Bacqua; twice on two different women as reported by Handry; twice also by Le Maistre, of Aix; once by Dariste at Martinique; once by Vonderfuhr in 1823 at Dahlen; another time, on the 18th of May, 1827, by Andreini, at the Hospital of Florence; twice by Schenck; once by Groefe, once by Lantz, once by Buren; once in the colonies by Gardey, in October 1822; twice at Saint Pierre on the same woman; once by Müller, once by Mergaut, once by Johanknecht; once in 1824 by Engeltrum, once by Sernin, Alazar, and Vigaroux, according to Lagardère; twice, as it is said, by Lordat, on the same woman, who died of the third; once by Metz; once by Walther, in 1818, on a woman who died in 1821; once at Stenberg, 2d of September, 1810, by Chapuis; twice 4th of May, and the 26th of October 1823, at Maestricht, by Bosch, the younger; twice on the same woman by Loreille; once by Collin; four times by Jolly; so that we cannot refuse to believe the possibility of saving some women in this way.*

The danger attending it cannot, however, be denied. Boerhaave and Boer were doubtless wrong in stating that scarcely one successful case could be found in fourteen operations; but it is at least certain that it has been performed four times within the last twenty years at the *Paris Maternité*, and that the women all perished; that, out of seventy-three cases cited by Baudeloque, forty-two were followed by death; that of one hundred and six cases reported by Sprengel, forty-five were unsuccessful; and that of the two hundred and thirty-one operations mentioned by Kelly and Hull, one hundred and twenty-three were ineffectual in saving the lives of the women. The unsuccessful cases should be given with the successful. Deleurye cites two; Coutouly one; Lauverjat two; Ansiaux two; Millot two; Jolly two; Lovati two; Riecke two; Catalica one; McKibbin one; Gensoul one; Bello one; the *Revue Médicale*, the *Journal Complémentaire*, the *Lancette Française*, each one; Schlegel one; Busch one; Mazzoni one. And do not the cases reported by Girard, Villars, Stein, Merrem, &c., belong to this sad category? Let us add that all the successful cases have certainly been published, and that there is a great number of them whose authenticity may justly be called in question; whereas, according to all appearances, the same thing has not happened to all the unsuccessful cases, of which perhaps the greater proportion may have been passed over in silence. It may be stated, therefore, that, up to the present day, the Cæsarian operation has proved fatal in at least one

* Let us add that it has been twice performed by Professor Gibson on M. R. in Philadelphia, saving, in the first instance, a daughter, and, in the second, a son, both of whom, as well as the mother, are still in good health. It has also been recently performed in Germany, with perfect success, for the fourth time, on the same woman, by Michaelis. For an account of Dr. Gibson's operations, *vide* the *American Journal of the Medical Sciences*.—M.

out of two cases, and that Tenon was mistaken in asserting that, since the time of Bauhin, it has been performed at the *Hôtel Dieu* on seventy women, who recovered. By the report of J. Burns and S. Cooper, it appears that not a single well-attested case of its successful performance has occurred in Great Britain. Of twenty-five operations in this country by the most able surgeons, Merriman could find but a single authentic case of success, that of Barlow, and doubts the success attributed to Maria Dunnally. Denman also declares that he has never performed it, and has never seen it performed in Great Britain. Fielding Ould says that the practice is a proof of detestable inhumanity; that it is illegal and barbarous. It is useful, according to Osborne, when there is less than an inch and a half at the straits. According to Monro, the contact of the air causes the danger, and it should be avoided at all hazards.

I think these details will suffice to exhibit this operation to young practitioners in all its importance, and to prevent them from resorting to it in any case save where the necessity is absolute.

Nevertheless, it is difficult to conceive, *a priori*, that it is of so redoubtable a character. The wound which it is necessary to make in the abdomen is indeed very large, but the parts divided are not very delicate; there are no arteries, no large nerves, and nothing of any great importance to guard against; the peritoneum is wounded, but the digestive organs may be easily avoided; besides, how often have the largest and most complicated eventrations, and penetrating wounds of all kinds been seen which yet gave rise to no very serious consequences, and admitted of the recovery of the patients; is not the serous membrane of the belly laid open every day, without our being alarmed about it, in subjects affected with strangulated hernia? Would the wound of the uterus alone prove dangerous? But everything in this organ indicates that it possesses but a slight degree of irritability, a slight tendency to take on inflammatory action, and has the most favorable conditions for a sure and prompt cicatrization. Are there not several cases of women who underwent the Cæsarian operation successfully, subsequent to rupture of the womb, and particularly the one recently made public by Doctor Frank? The wound, which is at first very large, is soon reduced to one-fifth or one-sixth of its original size, and when the organ is free to contract, the hemorrhage ceases too quickly for any alarm to be felt in relation to it. Lastly, is it not possible by proper precautions to prevent the liquor of the amnios, the blood and other fluids from being poured out into the peritoneum during and immediately after the operation?

It would seem, then, that it is not so much upon itself, as upon the peculiar state of the woman at the time, that the serious nature of the Cæsarian operation depends. Consequently, I can scarcely refuse to admit the idea that, if we were to act as soon as the indication becomes positive, without waiting until the person becomes exhausted with vain efforts, the uterus in a state of inertia or on the point of becoming inflamed, if not already so; until peritonitis or enteritis has become imminent, or existent; or lastly, until the patient's life is in danger—the Cæsarian operation would not be near so often fatal as, unfortunately, it has hitherto been found to be.

In support of this view of the subject, I hope I may be permitted to allege a sentiment of Dr. Hull, who, with Burns, attributes the unfortunate results obtained by his countrymen to the circumstance that they never operate, in England, except in desperate cases, whereas upon the continent they are willing to have recourse to it at an early period.

We can, with difficulty, defend such a sentiment, when we see women survive such an evisceration as that described in the journal by Desault. Since, in a case of a woman torn by a bull's horn, when the wound was enlarged the next day with the bistoury, so as to permit the extraction of the fœtus, without causing the death of the mother, as described by Fritz, and which was also observed by Nan-

dot; and since the Cæsarian section was followed by recovery, although performed during gangrene on a patient observed by Bertrand, we cannot understand that it should be more dreadful when methodically performed.

3. *Indications.*—When the smallest diameter of the pelvis is less than fifteen lines, be the fœtus dead or alive, the operation of hysterotomy is the only chance of safety that we can propose to the woman. When this diameter amounts to from eighteen lines to two inches and a quarter, it is equally indispensable, where we do not wish to act upon the child; but in this case, the child must be alive; and further, it remains for us to decide whether it is better to follow the English doctrine and destroy the fœtus, than to expose the mother to the danger of losing her life. It has been so often performed only for the delivery of a dead child that we may indeed be permitted to call it in question: Merriman cites ten out of twenty-five cases, and I have myself found a dozen examples in fifteen or twenty years.

Lastly, it may happen that we shall be compelled to resort to it, even although there should be two inches and a half or two inches and three-quarters at the smallest passage, provided the forceps, turning, or the section of the pubis shall have been deemed useless, or have been tried in vain.

We may be called in the midst of circumstances much more embarrassing and distressing. Attempts at version and the application of the forceps have been followed by a large rupture of the uterus and vagina; the pelvis is contracted; the child presents by the face and is dead; the vulva, the vagina, and all the parts contained in the pelvis are so inflamed, swollen, and indurated, the womb so nearly detached from the vagina, and the women so enfeebled that we cannot change her position without exposing her to instant death. Should we then give up the delivery in such a case, and allow the woman to die, or ought we rather to operate in spite of so desperate a condition? I decided on this last course, in opposition to the opinion of many associates, but with the approbation of some others, in the presence of Maygrier, Moulin, Halma-Grand, and Bintot, in the month of November, 1838. The woman died a short time afterwards, notwithstanding which, I continue to believe that conscience dictates a similar course of conduct.

4. *After death.*—Not only ought the Cæsarian operation to be performed upon the living subject, but it is also a rule of practice to subject those to it who perish after the seventh month of pregnancy without being delivered.

The child does not always cease to live at the same moment with its mother, although most frequently it dies first. We might even believe, admitting as true what has been written upon the subject, that life may be maintained in the ovum more than twelve, twenty-four, or even forty-eight hours. The Princess of Schwartzenburg, who died at Paris in consequence of a burn, could not be opened until the next day, and the fœtus was, notwithstanding, found to be living. Another woman, mentioned by M. Gardien, was not operated on until after forty-eight hours had elapsed, and the child was found to be still alive. Flajani, Veslingius, and several other authors relate cases of a similar character; but may we give credit to the assertions of Cangiamila, when we find him affirming, in his *Sacred Embryology*, that, in the space of twenty-four years, twenty-one children were saved in this manner at Montéréali, thirteen at Girgenti, and that the Cæsarian operation was performed under these circumstances twenty times at Syracuse in the course of eighteen months?

Burton, who has collected many similar examples, goes on even to relate the case of a woman who was cut in two by a cannon-shot at Berg-op-Zoom, and whose child, enclosed in its membranes, fell into the water, and was taken out alive some time after by a soldier who was passing by. Others have said, as Ebel, that children have been thus delivered alive even after the burial of the mother. We see, in a report signed by many witnesses, that, in the case of a woman who

died suddenly in the morning at seven o'clock, the person watching saw on the evening of the next day the belly move, and the child escaped the day following.

If such success is incredible, it is not so in some other cases. We do not know how far we may receive what Sarrois relates of a woman who died in labor, and who was delivered of a living child more than two hours after, by some unknown person, by the Cæsarian section: but we cannot deny that Guillemeau has succeeded twice by operating as soon as possible, and that Jackson also extracted a living child at the end of half an hour with the forceps. Deleau tells me that he has also saved a child by operating a quarter of an hour after the death of the mother, and a case has also occurred at the *Maternité* of Paris, Huguier has not been less successful in the case of a woman who died of phthisis at the hospital of Saint Louis. It is not the less true, however, that, in spite of all possible celerity, a dead child only is usually taken from the womb of a woman who is subjected to the Cæsarian section after death. The instances collected at *Hôtel-Dieu*, and at the *Maison de Santé*, by Jolly; that cited by Duparque, and that which occurred in the practice of Désormeaux, father and son; also those at the *Maternité* during fifteen years; the four cases of Laverjat; and the thirty-two cases, with a single successful one, of Riecke—are still new proofs of it. The facts announced by Green, Blundell, Burns, the two successful cases of Mazzoni, joined to those which I have related above, are but rare exceptions, similar to what Harvey, Schurigis, Buffon, and Wrisberg have said relative to certain children preserved alive in the membranes, or in warm water, out of the uterus. Although there is, indeed, no direct circulation between the placenta and the womb, it is, nevertheless, evident that, after the death of the mother, the child cannot continue to live beyond a few minutes, or a quarter of an hour, supposing that it does not die before. The conclusion which we draw from these remarks is that, after an hour or two, the Cæsarian operation on a dead woman is altogether useless.

Be this as it may, the Roman law, *lex regia*, which is referred to Numa Pompilius, ordered the physicians of that period to open the bodies of all women who died pregnant, with the view of preserving citizens for the state. To fortify this ancient usage, without compromising the lives of women who might be only in a state of apparent death, the Senate of Venice issued a decree in 1608 and 1721, which ordered severe penalties upon those members of the profession who should operate upon a person supposed to be dead without the same degree of care as if she were actually living. In 1749, the King of Sicily made another law, by which he inflicted the penalty of death upon physicians who should omit to perform the Cæsarian operation upon women who should have died in the last months of pregnancy.

It is very useless, no doubt, to think of preserving the life of a fœtus previously to the end of the seventh month; but in Catholic countries there is a desire at least to baptize them, and that the operation should be performed, in fact, if the woman has passed through one-half of the period of pregnancy.

As to the necessity of acting, immediately subsequent to the death of the mother, with the same precautions as if the woman were known to be living, no one will entertain a doubt—in view of the difficulty of ascertaining with certainty that life is irrevocably extinct, and of the promptitude with which we ought to act under such circumstances. Precipitation might really produce a decease which might possibly be otherwise avoided, and the time required to establish the certainty of the woman's death would more than suffice to ensure the loss of the child, which, in fact, is never extracted alive, excepting in a few cases, appertaining somewhat to the miraculous, unless the extraction be effected during the first moments that succeed the death of the mother.

Van Swieten and Baudelocque mention three cases of women, supposed to be

dead, on whom the Cæsarian operation was about to be performed, when they recovered from their lethargic state. Peu relates an instance far more calculated to excite alarm: he commenced his incision, when the woman gave a shudder, accompanied with grinding of the teeth and a movement of the lips. Trinchinetti speaks of a much more unfortunate case. The woman supposed to be dead had only fainted. The operation killed her, and the arterial blood spirted over the surgeon while he incised the womb. Rigaudeaux has related another one not less remarkable: he was sent for, two leagues from Douai, to see a woman whose labor had excited great uneasiness; when he arrived, she was believed to have been dead for two hours. Instead of opening the abdomen without any examination, he explored the genital organs, found the pelvis well formed, and proceeded to turn and deliver the child by the feet, which was born in a state of apparent death, but which with great exertion was brought to life in about two hours. The limbs of the mother preserving their suppleness, he forbid them to bury her until the abdomen should have turned green; after a few hours, this woman recovered so completely from her insensibility that she came herself, four years afterwards, to inform Rigaudeaux that she was not dead!

Thus, when called to a woman who has lately expired, the first thing to be done is to ascertain the state of the pelvic passages, and whenever they are sufficiently capacious, an attempt should be made to extract the child through the natural passages. In the second place, if hysterotomy is found to be indispensable, it is to be performed according to the same rules, and with as great care as if the woman were living. By acting in this manner, whatever may chance to occur, we have nothing to reproach ourselves with, and nobody is liable to be blamed.

5. *Statistical Recapitulation.*—One of the facts which serves as a starting-point to Michaelis is that in which the Cæsarian operation was practiced three times on the same woman, named Adawetz, who was born in 1795 at Wilstar in Holstein, who suffered from rickets, who was only four feet high, and whose pelvis measured but two inches and a quarter from the symphysis pubis to the promontory of the sacrum. Dr. Zwanok performed the first operation on the 18th of June, 1826, after having tried the forceps; a profuse hemorrhage took place, which was arrested with cold water; the child had been dead for a long time, but a cure was completed at the end of a month. No accident followed except the retention of urine. On the 21st of January, 1830, another operation became necessary; the pains had existed for twenty-four hours. An incision was made along the left of the linea alba by Professor Wiedemann. The placenta presented, and was easily extracted, as was also the body of the child; the head, at first retained by a strong contraction, soon escaped. The child lived, and the woman was able to be up on the 21st of February. On the 28th of March, 1832, a third operation was performed. The left side of the abdomen was chosen, and an incision was made a little obliquely from within outwards, running from the commencement of the second cicatrix above, to within half an inch of it below. The child weighed six pounds and three-quarters, and cried immediately. Moderate traction brought away the placenta, and the hemorrhage, which was considerable, was arrested by pouring water from a height. On the 27th of May, the woman left the *Maison d'Accouchement* with her infant, which was strong and vigorous.

It may be stated, in fine, that this was the first case in which the Cæsarian operation was performed several times upon the same woman with success.

L. Mantz was operated upon in 1797, and afterwards in 1805, by Drs. Mangold and Burckhard (cited by Oslander).

Bacqua, of Nantes, operated twice with success on a woman named Gabory, who died a short time since, and a description of whose pelvis was given by Mareschal.

Rhode and Sommer operated on a woman at Riga, first in 1796, and afterwards in 1810.

Lorinser of Nismes, in Bohemia, operated on a woman named Groger in 1802, and then in 1805.

Le Maître d'Aix (Haute-Vienne) operated on a woman named Fauve in 1805, 1807, and 1811.

Merrem, at Cologne, operated on a woman named Viandes, in 1821, and afterwards in 1826.

Schenck succeeded in 1823, and again in 1825.

Dariste of Martinique, also, relates two successful operations on the same woman.

Lambton, of Orleans, was not less fortunate in 1775, and afterwards in 1779.

The woman Adawetz, however, is the only one who has been operated on successfully three times; many others died after the second operation.

Schmidt operated, at Eylau, on a woman in 1821, and then in 1825, when she died.

Engeltrum, of Amsterdam, operated the first time in 1824, the second in 1826. The two children lived.

Locher, of Zurich, operated in 1817, and in 1819.

THE SUCCESS OF THE OPERATION IN THE EIGHTEENTH AND NINETEENTH CENTURIES.

1. EIGHTEENTH CENTURY.

<i>a. Cases fatal to the mother,</i>	39
Adding an equal number of those of Baudelocque, makes a total of	78
We do not count those which were done in England, because, as Wanner has already stated, the English never operate, except when the sacro-pubic diameter is only an inch and a half. They number	7

2. NINETEENTH CENTURY.

<i>Cases fatal to the mother,</i>	62
Grand total of cases unfortunate to the mother,	147
<i>b. Cases ending successfully to the mother,</i>	
In the eighteenth century,	70
In the nineteenth century,	48
Grand total of authentic cases,	118

Indications.—Sixty-two times out of eighty, the operation was determined on in consequence of contraction of the pelvis, especially of the antero-posterior diameter of the superior strait.

Thus we find one inch in 1 case; from one to one and a half inch in 8 cases; from one and a half to two in 23 cases; from two to two and a half inches in 25 cases; from two and a half to two and three-quarters in 5 cases.

In Germany, osteomalacia caused deformity of the pelvis seventeen times, and thirteen of these were met with in a district situated on the borders of the Rhine between Bonn, Wesel, Marbourg, Giessen, and Munster.

From 1821 to 1830, the operation was performed sixty-one times, and only twenty-eight times from 1810 to 1820. Statistics prove that the time of its performance has had no influence on its mortality. Of thirty-six operations performed in lying-in hospitals, eleven have been successful, and twenty-five unsuccessful. In private practice, thirty-one out of sixty have succeeded.

As to the children, we observe that they have been born alive every time that the operation has been performed before, or immediately after the rupture of the bag of waters. The proportion of women saved, to those who die, is as four to three.

CAUSES OF DEATH.

Immediate consequence of the operation;	2
Convulsions,	2
Feebleness and exhaustion,	3
Hemorrhage,	7
Meteorism,	3
Effusion into the abdomen,	3
Osteomalacia continuing,	1
Colliquative diarrhoea,	1
Inflammation of the peritoneum and intestine,	13
Gangrene,	8

Days of Death.—1st day, 8 cases; 2d day, 6; 3d day, 10; 4th day, 5; 5th day, 12; 6th day, 4; 7th day, 1; 8th day, 3; 18th day, 1; 20th day, 1; 27th day, 1; 30th day, 1; 45th day, 1.

Time of Cure.—3 cases in three weeks; 4 in three weeks; 5 in five weeks; 5 in six weeks; 3 in seven weeks; 3 in eight weeks; 2 in 10 weeks. Averaging from the fifth to the tenth week.

Living children, 67. Dead children, 29.

The cicatrix gave way but three times out of forty-eight cases, holding remarkably in subsequent pregnancies.

The report of the successful operations the second time is very favorable; that is to say, as 11 to 5: while the general relation of the successful to the unsuccessful operations is inverse, 3 to 4.

6. *Methods of Operating.*—When the Caesarian operation used to be performed only upon the dead subject, the incision was made upon the left side of the abdomen: "*Let the woman be opened with a razor along the left side,*" says Guy de Chauliac, "*inasmuch as that part is freer on account of the liver.*" But since it has been attempted upon the living female, it has been subjected to rules formed on a better foundation. Among the various methods proposed by different accoucheurs, there are five which have attracted special attention: in one, the incision is made upon the median line, and parallel to the axis of the body; in the second, the cut is made outside of the rectus muscle; in the third, the abdominal parietes are divided transversely, upon one of the sides; in the fourth, the wound is made immediately above the Fallopian ligament, and parallel to that fibrous band; and lastly, the fifth is made at the level of the crista of the ilium.

a. *Mauriceau's Method.*—Solayrès, Hankel, Deleurye, &c., are wrong in attributing the idea of cutting down upon the median line to Platner, to Guenin, or to Varoquier. Mauriceau had expressed himself in the following terms: "Most persons direct the incision to be made on the left side of the belly, but the opening will be better in the middle, between the recti muscles, for in that part there is nothing but the integuments and muscles to be cut." This proceeding, which is preferred by Baudeloque, and now generally followed in France, England, and Germany, permits us to avoid the muscles, and to act only upon the linea alba; only a slight degree of pain is produced; no artery can be wounded, and, moreover, the uterus is incised parallel to its principal fibres. But it has also been said that this method exposes us to the hazard of inflicting a wound upon the bladder, and that the discharge of the fluids, whether during or after the operation, cannot be effected without difficulty; the wound, occupying none but fibrous tissues, is slow in healing, and the uterus, being laid open throughout almost the whole extent of its anterior wall, instead of tending to approximate the lips of the division, rather separates them by its contraction.

b. *Method of the Ancients.*—In operating upon the side of the abdomen, the ancient accoucheurs generally chose the left side, and made sometimes a straight,

sometimes a slightly oblique incision, or one of a crescent shape, but always immediately outside of the rectus muscle. According to the statements of the physicians who employed it, this method has over the preceding one the advantage of avoiding all danger of wounding the bladder, of permitting the cicatrization to be easily effected, and of rendering the issue of matters that must escape from the wound far more easy. As the womb almost always undergoes a twist upon its axis, inclining to the right or left, it has been supposed that, by making the incision along the median line, it would fall nearer to its left edge than to the middle of its anterior region; this also is one of the considerations from which it has been recommended that the operation should be performed upon the side towards which the uterus has naturally deviated. Even admitting all these advantages to be real, they would, nevertheless, be compensated, it seems to me, by the risk of wounding the epigastric artery or some of its branches; of having a wound, the lips of which it would be almost impossible to keep in contact, on account of the retraction of the oblique and transversalis muscles, and by the impossibility of obviating the absence of parallelism in the two wounds of the abdomen and womb.

c. *Method of Lauverjat*.—To avoid the disadvantages connected with these two methods, Lauverjat, who at first admitted the great superiority of hysterotomy at the median line, attempted to methodize a procedure which had already been resorted to by some practitioners, and recommended a transverse incision about five inches in length between the rectus muscle and the spinal column, somewhat below the level of the third false rib, and more or less so, according as the fundus of the womb is more or less remote from it. This method, of which Saint Germain, L'Aiguiller, and Lebas speak, in the opinion of Lauverjat, was adopted in 1772, at Pipelet, near Compiègne, in the case of a woman who came to ask for a truss, and at Roinville, by Sanson, on another woman. By proceeding in this manner, the fibres of the transverse muscle are rather parted than divided; the epigastric and lumbar arteries are avoided; we fall upon the fundus of the womb, whose cavity forms a sort of funnel, which renders the discharge of the lochia very easy, both by the vagina and hypogastrium; the parallelism is easily maintained; the suture is not required; mere position suffices to keep the wound in exact apposition; lastly, the external angle of the cut occupying a low situation, extravasations into the abdomen are incomparably less to be dreaded than in the other methods. But it may be objected that the fibres of the external and internal oblique muscles are necessarily divided; that the least effort must force the viscera out; that the womb, being divided at its fundus, where its vessels are largest, soon removes to a considerable distance from the external opening, and that its fibres, by contracting, must rather hinder than promote the approximation of the edges of the inner incision; so that, notwithstanding the two successful cases of Lauverjat, and the preference apparently given to him by Sabatier and M. Gardien, this method, as Blundell remarks, exposes the epigastric artery to injury, and is evidently scarcely less dangerous than the two former ones.

b. *German Methods*.—1st. Stein, preferring an oblique or diagonal section, carries his incision from the horizontal portion of the pubis of one side across the linea alba to the end of the last false rib of the opposite side.

2d. Zang carries his incision from the middle of the linea alba to within an inch and a half of the middle of the horizontal portion of the pubis on the same side.

3d. Jorg had already prescribed, in 1806, the incision into the vagina, or, at any rate, of the neck of the uterus, after opening the abdominal parietes. More recently, in 1820, Ritgen, wishing to avoid the peritoneum, proposed a semilunar incision from the anterior superior spinous process of the ilium to the spinous process of the pubis; to separate the peritoneum and push it within, so as to

make an incision of the vagina and neck of the uterus. At first, I could not see how it could be possible to incise the summit of the uterus without cutting the portion of serous membrane which envelops it; subsequently, the difficulties inherent to this process, joined to the dissection which it is necessary to make in the iliac fossa, do not appear of such a nature as to render the operation less grave than those which have been mentioned. Besides, it only exists in theory, and no one has, as yet, put it in practice on the living woman. Charles Bell had already advised an incision of the neck, and not of the body of the uterus in the Caesarian section; and Madame Boivin is said to have communicated the same idea to B  clard about 1820; but their precept has only been followed by A. Baudelocque. However, without believing, with Madame Boivin, that the patient operated on almost always dies of hemorrhage, and without concurring with Saccombe, heretofore opposed by Morlanne, that wounds of the uterus do not cicatrize, I may agree that these two accidents are very common. They have occurred: the first, because the uterus, not contracting, remains inert, or contracts imperfectly after the operation; the second, because every inflammation, however slight, with general reaction, suspends the cicatrization of cuts and ulcers, so that they are rather the effect than the cause of the risks which the woman runs.

e. *Method of A. Baudelocque, Jr.*—Attributing the principal dangers of the Caesarian operation to the double wound of the peritoneum; and, further, regarding wounds of the uterus as almost essentially mortal in their character, A. Baudelocque, who insists that Dubois has performed the Caesarian operation three times successfully upon the same woman, and that, by the method of Lauverjat, five out of eight were lost, has proposed a new method, which in both these respects appears to him to be infinitely preferable to all others, and which in fact differs from them very considerably.

The incision is commenced near the spine of the pubis, and extends, parallel to Poupart's ligament, beyond the anterior superior spine of the ilium. He selects the left side, on account of the inclination of the cervix, when the womb is oblique to the right, and the right side where there is a left lateral obliquity. After having divided the abdominal parietes without touching the epigastric artery, he pushes away the peritoneum from the iliac fossa quite down into the excavation, and detaches it from the upper part of the vagina which he opens through this opening, which ought to be sufficiently free; the finger is conducted into the os uteri, which is now to be drawn up towards the wound in the abdomen, while the fundus is at the same time pressed in an opposite direction, so as to make it turn over more readily. When the operator has succeeded in bringing the orifice of the womb opposite to the opening made in the abdominal parietes, the delivery is entrusted to the uterine contractions, or, provided it should be absolutely necessary, the orifice might be dilated with the fingers, and the f  tus extracted either with the hand or the forceps.

The idea of this method, which belongs to Jorg and Ritgen, and which the author denominates *elytrotomy*, is certainly ingenious; he has performed on the dead subject, both pregnant and not pregnant, a number of experiments, which have confirmed him in the favorable opinion he had previously formed concerning it, and which have sufficed to induce some practitioners to suspend their judgment in relation to its value. Nevertheless, I can scarcely believe that it will be found practicable in a majority of cases, or that the laceration of the vagina, in addition to the disturbance necessarily occasioned in the iliac fossa or in the excavation, would be less redoubtable than the simple and methodical incision of the peritoneum and womb, such as may be performed in ordinary hysterotomy. I may further add that M. Baudelocque himself has very recently been obliged to have recourse to the Caesarian operation, properly so called, after having tried the operation of *elytrotomy* in the case of a woman who had long been under his supervision, and in which he was assisted by M. Hervez de Chegein. I am

aware that one single fact does not warrant us in drawing rigid conclusions; but this, which is the only one we have in regard to the living subject, seems to me to lend great force to the distrust of the author's notions, derived from *a priori* reasoning.

f. *Method of Dr. Physick.*—Another mode of operating, which is somewhat like that of Professor Ritgen, and also is not very different from that of M. Baudelocque, appears to have been proposed, almost at the same time, by Dr. Physick. After having remarked that in pregnant women the peritoneum is easy to separate from the bladder and parts about the os uteri, this surgeon conceived that, by making a horizontal incision immediately above the pubis, the os uteri might be reached and opened without interesting the peritoneum: but, notwithstanding what Dr. Horner may say concerning it, this operation is but little worthy of its inventor, and does not deserve the trouble of being discussed.

g. *Method of the Author.*—The incision of the abdominal parietes should always correspond with the most projecting part of the uterus. Before the rupture of the membranes, it is almost constantly on the right side; afterwards, it is usually, on the contrary, along the linea alba. In the first case, and always when the womb is voluminous and strongly inclined to one side, I think it better to make the incision obliquely, from above downwards and from without inwards, as we do in tying the iliac artery after the method of Abernethy, than in a vertical direction. This is the only way of avoiding the epigastric artery and of remaining on the outside of the external straight muscle. In dividing the womb, it appears to me that the semilunar incision presents the advantage of allowing an easier exit to the fœtus, of closing up more quickly, and, in consequence of its convexity, of being able to be carried always to the point where there are fewest vessels. It is thus that I operated on the woman of whom I spoke above, and I believe that, in more favorable conditions, a similar modification should not be neglected.

7. *Manner of Proceeding.* a. *Before operating.*—If the child runs any risk, it is necessary to hasten. We should take care, before deciding on the operation, that the pelvis is too narrow to allow the child to escape. Le Bas says that, while A. Leroy discussed the necessity of the Cæsarian operation, the woman delivered herself without any assistance! It would be ridiculous to propose, at the present day, after the fears of Monro on the subject, as Aitken and Sarrois did, to place the woman under water during the operation, so as to prevent the entrance of air into the peritoneum. Bleeding, baths, purgatives, or any other proper means may be sometimes made use of. And lastly, the conduct here, in relation to the preparations, is the same as in all the great operations.

If the bag of waters is not ruptured, ought it to be torn, as Planchon advises, previously to making the incision into the womb, or must it be let alone, as most authors advise? By emptying the membranes, the escape of the liquor amnii into the peritoneum is prevented, and there is less reason for fear as regards hemorrhage and inertia of the womb. But these are not the most to be dreaded of all the occurrences that may take place during the operation; we are much more frequently embarrassed by the contraction of the womb than by its inertia. When the ovum is whole, the child can be much more easily extracted; the wound in the uterus, at first more extensive, is, however, reduced at last to much smaller dimensions; lastly, there is less irritation excited in the womb, and upon a careful consideration of all the circumstances, I believe, in common with M. Désormeaux, that it is better to preserve the membranes whole.

We should never omit to empty the rectum and bladder, especially if it be intended to follow the method of Mauriceau. The apparatus consists of a convex bistoury, a straight probe-pointed bistoury, pincers, scissors, suture-needles, thread, quill-barrels, adhesive strips, lint in rolls and in pledgets, or pieces of

linen spread with cerate, of compresses both oblong and square, a bandage for the body, small and large sponges, a syringe, canulas of gum-elastic, to be used in case it should be necessary to make any injections, water, both cold and warm, and vinegar; wine and Cologne water are also necessary.

If possible, the *patient* should be laid on the bed that she is to occupy during the first few days after the operation; her position ought to be an easy one. She should be placed on her back, with the legs and thighs very slightly bent, and assistants are charged to watch against any sudden movements which the pain might compel her to execute; two intelligent assistants must apply their hands upon the sides and fundus of the womb, so as to circumscribe it very exactly, in order that no organ may happen to slip betwixt its surface and the abdominal parietes, and so that it may compose with the latter parts but one single mass. For this purpose, the naked hands seem to me less suitable than they would be if applied upon pieces of broad flat sponge, as advised by Dr. Hédénus, as MM. Walther and Kluge were in the habit of doing, and as I have done myself.

b. *Incision*.—With the convex bistoury the surgeon makes an *incision through the integuments*, from near the umbilicus towards the pubis, in length from five to six inches, without its being necessary, or always even possible, to pinch up a large fold of them, as advised by Levret. The subcutaneous layer, the aponeurosis and the muscular fibres, as well as the cellular tissue, provided we do not operate upon the median line, are successively divided in the same manner and to the same extent. This incision ought not to be carried too near to the pubis, on account of the bladder, and because the abdominal parietes are generally very thick in that situation. It would be better to extend it above the umbilicus, taking care to pass to the left of it, so as to avoid the umbilical vein, and more particularly the anastomosis which may exist between it and the epigastric vein, an anastomosis which has latterly been noticed by M. Mesniere, Clement, and Martin.

After having opened the *peritoneum*, so as to admit of the introduction of the left forefinger, to serve as a conductor for the instrument, the wound in that membrane is to be enlarged by means of the probe-pointed bistoury, to the same extent as the wound in the skin.

The *womb* is now exposed; it is to be incised layer by layer, and slowly, until we reach the surface of the ovum; then, in order to retain for the cervix as much of its length as possible, the assistants are told gently to press the fundus of the uterus downwards and make it turn somewhat in front; we might, indeed, like Dr. Kluge, hook the lower angle of the wound of that organ with the finger, so as to favor such a movement, which, by affording a facility for extending the section very far upwards, permits us to guard the cervix. With reason, Deleurye and Levret advise the incision of the womb to be made from below upwards so as to prevent the intestines from escaping, as they well supposed that the uterus should serve as a *point d'appui* for the incision of the abdominal parietes. In order to avoid the risk of wounding the vessels of the placenta, it is better to use the probe-pointed bistoury to finish the incision, than to have recourse to the grooved director to guard the bistoury with. Further, I can conceive no objection to letting the point of the finger detach the placenta and membranes to a certain extent.

This is the moment, and not before the commencement of the operation, that it would be perhaps well to follow the advice of Planchon, and rupture the membranes by the vagina, either with the fingers alone, or with the instrument of Siebold, as is generally done in Germany. Supposing, which appears to me preferable, that the membranes should be pierced from the incision, it will be necessary for the assistants to redouble their care to prevent the parietes of the abdomen from abandoning the womb. In this way the effusion of the waters into the cavity

of the peritoneum will be obviated, and the tendency of the viscera to escape outwards will remain ineffectual.

c. The *extraction* of the child ought to take place without delay; when it presents by the head or by the breech, it is drawn away in that position, and, to favor its escape, the assistants are told to press gently upon the sides of the womb through the parietes of the abdomen; if it be situated otherwise, the feet must be got hold of, and the extraction performed with the same precautions as in delivery by the natural passages, special care being taken not to bruise or stretch the lips of the wound in the uterus.

As soon as the fœtus is withdrawn, the practice recommended by Planchon might be adopted, viz., by means of a sound the cord might be repassed through the wound, for the purpose of removing the after-birth through the vagina, but no beneficial effects would be ultimately obtained by it, and the celerity of the operation would be sensibly lessened. After all, the retraction of the womb, which would most generally render this operation impossible, soon forces the placenta to engage in the wound, and thus points out the route we should select in extracting it. In order that it may present less volume and less resistance, one of its edges even may be taken hold of, if possible, rather than pull it away by the cord only. As to the membranes, they must be carefully twisted into a rope as in a natural delivery, to prevent any of them from remaining in the uterus. Should any blood have been lost and formed into clots, these ought to be removed with the hand. It would be well, moreover, to cleanse all the parts by means of an injection of warm water: but I do not think, with Wigand, that it is necessary to carry the hand into the uterus to excite its contraction, and to repel the placenta by the natural way; nor, with Stein, that we should place in its cavity a piece of sponge three inches long, to be left there as a *point d'appui* for the uterus, or to absorb the injections; nor that, for the purpose of keeping the os uteri open, it is of any advantage to place in it the tent recommended by Baudelocque, or the *cierge pertuisé* of Ruleau, or the tent of Rousset, or the sound of M. Tarbès, or any species of canula whatever; these means would not prevent the os uteri from closing, and would augment the irritation to no purpose. The finger introduced from time to time suffices to keep it free enough, should it cease to give issue to the matters, which, after all, nothing can prevent from passing wholly or partly out of the wound.

d. *Dressing*.—The *operation being terminated*, we must next think of putting a stop to the flow of blood. In the lateral operation, and especially in that of Lauverjat, several arteries may have been divided; they should now be tied, provided they should not have been secured during the progress of the operation. During the operation, the principal orifices of the uterine arteries have been closed by the fingers of the assistants; there never can arise any question about obliterating them with the ligature; although Siebold and M. Ritgen have thought proper to recommend it. But it has been recommended to cauterize them with vitriol; to touch them with alcohol; to apply, as Heister does, the balsam of copaiba to the wound; and, generally, to trust them to the contraction of the womb, which is to be solicited, provided it be slow in taking place, by irritating the cavity of the organ or the lips of the wound with the fingers, or linen moistened with vinegar and water. After a few minutes, the length of the incision in the womb is reduced to from one to two inches, and thenceforth hemorrhage of any kind becomes impossible. I shall pay no attention to the advice of M. Michaelis, who, in order to prevent future impregnation, and especially, says he, to avoid too great reaction, proposes the extirpation of the uterus; nor to that of Blundell, who recommends cutting the Fallopian tubes, or, better still, the excision of a part of them with the same view!

In England, in Germany, and also in France, the wound in the abdomen is generally closed by the interrupted or twisted suture, because, it is said, that is

the only means of keeping the lips in contact, and of preventing hernia of the viscera. Zang and Autenrieth even insist on the sutures being applied before the incision is made into the womb, so that it may be closed up as soon as possible. Sabatier and Deleurye, however, think it ought to be dispensed with, and say that, unless the whole thickness of the abdominal parietes be included in each stitch, which would be dangerous, the adhesive strips will do as much as the sutures, without compromising, in the same manner, the safety of the patient. But, notwithstanding the reasons urged by that learned author, it seems to me to be preferable to have recourse to the suture, even where Lauverjat's operation has been adopted. In all cases, the lower corner of the wound should be left free to allow the matter to escape. Besides, the sutures do not prevent the application of adhesive strips over their intervals, nor the favorable action of a uniting bandage and a proper position.

The wound is then covered with a piece of linen, perforated, or with strips spread with cerate; two long and broad compresses are placed on the sides; some pledgets of soft lint, common compresses, and a body-bandage well applied, will complete the dressing.

Previously to leaving the woman, the linens soiled during the operation should be removed; she is to be placed in the middle of her bed, taking care to move her as little as possible, and we should endeavor to place her so that her muscles may be all in a state of relaxation.

Some antispasmodic potions, slightly opiated, to calm the nervous agitation; some precautions to ensure the discharge of the lochia by the vagina instead of their escaping into the peritoneum; diluting drinks, bleeding and leeching, as soon as any symptoms of inflammatory action become manifest; and the greatest repose, both of mind and body, are all that the surgeon can recommend to the patient to obviate the dangers which threaten her.

B. Vaginal Cæsarian Operation. 1. *Indications.*—According to the reports of authors, there are a great number of causes which may necessitate the performance of the vaginal Cæsarian operation. An obliteration, with fibro-cartilaginous induration of the os uteri, as in the case related by Simson, and also in that other case spoken of by Van Swieten, is one of the most common causes. Mad. Lachapelle and Dugès have published three cases, and in that of Cauvy a *stylet* could scarcely be introduced into the cavity of the uterus. Besides these contractions, the possibility of the existence of which some persons have accused me of denying, although I have never thought of so doing, and all doubt of which has been removed by many examples which have been published, there may exist also an actual occlusion of the os uteri which would demand still more imperatively the vaginal incision. To what I have stated while speaking of the deviations and occlusion of the uterine orifice in the article *Dystocia*, Lobstein's case and that of Berger may be added as the most authentic; and it is equally necessary to append the examples of Rummel, Grimm, Rainer, and Meisner. The operation on the patient of Lobstein was very successful, although the womb closed again. Morlanne's case would have been still more positive if the body of the woman, who died without being delivered, had been opened, and if her parents had permitted an examination of the womb *in situ*.

Violent convulsions which endanger the life of the woman while the orifice is too tense, and still insufficiently dilated to admit of the introduction of the hand, as is observed in the cases by Duboscq and Lambron, are of the same kind.

An extreme obliquity of the orifice backwards, while the head of the child at the same time forces down into the excavation, and even as low as the vulva, the anterior portion of the womb, which it extends, renders thin, and would at last rupture, provided an incision were not soon made, as was done by Lauverjat, is the occurrence which has most frequently rendered it necessary.

Callosities and obliterations of the os uteri had already originated the idea from the time of Mauriceau; for Fournier, who advised it, said that he performed the

incision by cutting behind and in front with the *forceps deceptorius*, or, even better, with a sheathed bistoury of his own invention. Mesnard speaks in the same way, and Barbaut maintains that in a similar case an incision of the os uteri with or without the speculum suffices, and that it should supersede the operation of *gastro-hysterotomy*.

It may also become useful where the uterus, having escaped from the pelvis during pregnancy, has never been reduced, and where its orifice cannot be dilated by means of the fingers, although there may be danger in delaying the delivery, as in the examples cited by M. Thénance, Jacomet, and a surgeon at Vaux mentioned by M. Bodin and several others, of whom I have spoken in the article Displacements of the Uterus, have cited cases of it; but it has been proposed more particularly in cases of scirrhus, and where the orifice presents such a resistance to the contractions of the womb that the woman is exhausted in vain efforts without affecting its dilatation.

The simple relation of the accidents which require it shows that the vaginal Cæsarian operation may be performed in two very different conditions. Sometimes, indeed, it is only necessary to unbridle the natural os uteri, which may be more or less contracted or diseased; at other times, on the contrary, we may be forced to make an entirely artificial opening to reach the child. Its necessity in the first case has been experienced by many practitioners. Lemoine said, long since, that, if the callous os uteri resists bleeding and relaxing means, it is better to cut it than to wait for it to tear. Smellie had his scissors for its performance, and we see how Coutouly and Lauverjat gave it their confidence. The second case also occurs frequently. The same plan of procedure should be followed, whether in complete obliteration, as in the case met with by Solera, or for a simple deviation, as in the examples of Lauverjat and Martin.

Lastly, it would be equally well indicated, as M. Bodin has attempted to demonstrate in cases of arm presentation, should it ever in any case be found really impossible to proceed in search of the feet, and if no other means of avoiding the amputation of the arm could be made available.

Although generally attended with but little danger, the accoucheur would be blamable who should perform it without a well-ascertained necessity. I cannot, therefore, but condemn in decided terms the temerity of those practitioners who do not hesitate to employ it, simply because the os uteri happens to be somewhat tense, and does not dilate according to their impatient desires; and according to what I said, when speaking of Deviations of the Os Uteri, I have no doubt that it has often been performed when it might have been easily dispensed with.

2. *Method of operating.* a. *Incision of the os uteri.*—In all cases, if there is an orifice, nothing is easier than to perform this operation; the speculum employed by some persons is of no use.

The woman should be placed as in touching, or the operation of version, according as one or the other of these positions is most convenient to the accoucheur, and best enables him to reach the point to be incised. Smellie's scissors, and the *utero-stomatome* of Coutouly, and all other instruments specially adapted to the purpose, are of no advantage here.

A probe-pointed bistoury, wrapped round with a narrow strip of linen to within eight or twelve lines of its point, is passed up upon the index finger; in this way, we carry it without difficulty within the os uteri, provided it be not too far distant from the centre of the pelvis; in the contrary case, Pott's curved bistoury should be substituted for the straight one. Strictly speaking, one incision might be deemed sufficient, as Dubosq and Lambron advise. But, as it is important that it should not be too deep, it would be preferable to make several of them at a small distance from each other. This is the process on which Coutouly and Lauverjat have already insisted, which Parea de Maggenti practiced with success in 1791, and which Moscati especially tried to bring into favor. The multiple

incision gave to this practitioner complete success in the case of a woman whose os uteri would scarcely admit a *stylet*. Paletta succeeded in the same way on the same woman fifteen months afterwards. On the contrary, a patient who was operated on by Moscati, the elder, by a single incision, died from a laceration of the parts. Other persons have since related cases in favor of the multiple incision. It was resorted to with success at the *Maternité* at Paris, in a case of contraction of the os uteri with adhesion of the posterior lip. Grimm was also successful after three incisions in a case of contraction with great deviation. Bongiovani did the same in a case of hardening of the os uteri, in which he failed with the forceps. The woman recovered. Soek acted in the same way, and I have besides found examples where pregnancy with descent of the uterus has called for the same operation. At a first view, it would seem that the passage of the head could not take place without enlarging such wounds so as to extend them to the body of the womb, and lacerate the peritoneum; but in fact this does not happen, and they commonly remain limited to the substance of the os uteri. In operating for a scirrhus or fibrous induration, but a very few ounces of blood are found to flow from the wound. M. Mignot practiced vaginal hysterotomy on a cow for an induration of the os uteri, saving both the mother and her young, and succeeded as well on a woman.

b. *Incision of the cervix uteri*.—When the anterior wall of the uterus is divided without extending the cut down to the os uteri, as Laverjat, Martin, Lobstein, Caffé, &c., have done, we are obliged to make use of a straight, or convex, and not a probe-pointed bistoury, to begin the operation with, which is always a more delicate one than the preceding. Too much care cannot be taken to avoid wounding the presenting part of the fetus while making the incision. But, when the womb has been once penetrated, the forefinger becomes a sure director, and the instrument may enlarge the wound as much as necessary, without any danger; let us, however, observe that there is less hazard in extending the incision backwards than forwards, on account of the bladder, and also that it is useless to make it very large. Posteriorly, the incision may reach the recto-vaginal cul-de-sac of the peritoneum, or even the intestine. It is better, therefore, to resort to the multiple incision than a single cut. If the woman remains on her back, the head of the fetus runs less risk during the first incision, but the tissues are also less easy to divide. When she is standing, the uterus is lower down, and is put more fully on the stretch.

After the delivery, the wound contracts very rapidly, and it often happens that not a half day elapses before the os uteri recovers its natural situation. If blood should flow in too large a quantity, it would be easily arrested by injections of oxycrate, and by the tampon; and the cautery, which is easy to apply, will rarely be necessary in such cases. As to the lochia, they escape either from the wound or from the orifice of the uterus, and in these respects the woman requires only such cares as are common after an ordinary parturition. Prudence, however, would dictate that a large gum-elastic catheter, or at least a *mèche* of fine lint, should be maintained for some weeks in the new opening, if there has been a real occlusion, or if the os uteri manifests any disposition to close again after the operation. M. Lobstein, who was obliged to withdraw this dilator sooner than he wished, saw the cut close up speedily. The menses did not subsequently appear with any regularity. Caffé was more fortunate, for the menses took place through the cut from the woman upon whom he operated; but it remains to be seen whether this will continue for a length of time.

ART. IV.—OPERATIONS ON THE CHILD.

§ 1. OF CEPHALOTOMY AND EMBRYOTOMY.

In England, the perforation of the cranium or reduction of the fetus, by

removing successive portions of it, even where it is still known to be living, since Osborne's time, is generally preferred to the Cæsarian operation. Wigand, combated by Busch, maintains the same sentiment in Germany, while Osiander does not seem to admit it in any case. The younger Stein gave the greatest possible extension to the employment of cephalotomy. He recommended it when the labor was interfered with by any causes purely dynamic; as, for example, in cases of convulsions caused by the pressure of the head on the nerves of the pelvis. We agree still less with M. Ritgen who, in doubtful cases, prescribes compression of the head, and such traction as to cause the death of the child before perforating the cranium.

A. In France, the operation of cephalotomy is not performed, except where the death of the child has been certainly ascertained, or at least become very probable, and where the delivery by the natural passages is altogether impossible. When the pelvis has a diameter less than fifteen lines, or the whole hand cannot penetrate into the womb, the Cæsarian operation is preferred, even though the child be dead. Upon this subject I will remark that our neighbors too rarely have recourse to hysterotomy, and that they are too ready to sacrifice the child, for fear of compromising the life of the mother; that here we fall into an excess of quite an opposite kind, and which is, perhaps, scarcely less blamable. In a case where every circumstance announces that the fœtus is still in full vigor, and that it is robust, there is no doubt that, instead of sacrificing it, as is done in Great Britain and at the north, it ought to be extracted without endangering its life, by means of operations which indeed are severe, but not always fatal to the woman. There is also no doubt, in my opinion, that cephalotomy ought to be preferred when there are good reasons for fearing the child's death, or for believing that it cannot continue to live. It would be too cruel, after performing the Cæsarian operation, to be able to present only a corpse, or a feeble, miserable being, which must perish in a few minutes or hours, to the unhappy mother as the price of all her sufferings and dangers! But it would be a great mistake also to suppose that embryotomy is wholly unattended with danger to the mother; it is, on the contrary, one of the most redoubtable and revolting operations in tokology, whenever it extends beyond the mere operation of craniotomy, or when the straits of the pelvis are less than eighteen lines.

To sum up, the operation of cephalotomy is indicated, 1. When the fœtus is dead, and the passages are too much contracted to permit its extraction with the forceps or by turning; 2. When it is very probable that the child is dead, or at the point of death, and when it cannot be got away whole without the performance of the operation of hysterotomy; 3. When the head alone remains in the pelvis, and cannot be extracted by the hand, the forceps, or crotchet. It would be useless, dangerous, and ought to be proscribed even in case the fœtus were dead, provided the small diameter of the inferior strait were less than eighteen or twenty lines in extent.

B. *Embryotomy*, that is to say, that operation which consists in introducing a cutting instrument within the cavity of the womb for the purpose of lessening the size of the child, dividing, and reducing it to small pieces, so as to be afterwards able to extract it piecemeal, was frequently employed by the ancients, who had no other resource, and did not confide enough in the powers of the system; but at the present day, the forceps, the lever, turning, symphysectomy, and the Cæsarian operation, properly appreciated as to their respective value, render it almost wholly useless; it is therefore no longer performed at the present day, except by certain country medicasters, who are as ignorant of the art of midwifery, which they disgrace, as they are of the plainest principles of the other branches of medicine.

Even the operation of craniotomy must very rarely be necessary or indispensable, since out of a total of more than twenty thousand labors, Madame Lacha-

pelle has mentioned only three instances of it.* M. Schweighæuser practiced it but once from 1793 to 1800 in 900 labors at the hospital at Strasburg, while his successor resorted to it four or five times in the space of seven months. In 220,000 cases, Riecke mentions 84; while in 18,000, Merriman counts 13; and Richter cites three in 2500 cases. The *céphalotrie*, of which A. Baudelocque claims to be the originator, and the relative value of which to the crotchet will hereafter be a question, will render it more and more rare in future. Besides, it would be useless to say with Schmidt that the forceps should not be substituted for it, for the forceps cannot, at any rate, take the place of cephalotomy, unless when we wish to crush the head. The spontaneous rupture of the cranium spoken of by Hamilton is too rare an accident to be counted on.

C. *Method of Operating*.—In performing it, Avicenna and Mauriceau made use of sharp extractors in the shape of a crotchet; Levret, Dionis, Fried, and Ould made use of sheathed perforators; Simson boasted of a ring-scalpel; spear-pointed perforators have been recommended and modified in an infinite variety of ways; but at present a single bistoury is employed, or the scissors of De la Motte, improved by Smellie, Denman, and by Walbaum, are made use of when it is necessary to penetrate to a great depth within the organs, and to exert a certain degree of force to perforate the bones. A kind of fleam fixed upon a long handle, armed with wings, invented by Burton, and the double blade, shaped like the instrument for pharyngotomy, proposed by Coutouly, have never been, and ought never to be, adopted. The same thing may probably be said of the new *perce-crâne* of Busch; of the *stomatome caché* escaping from a double blunt hook, with a sharp concave edge, invented by A. Baudelocque; and also Dugès' scissors, and of the sixty varieties of *perce crâne* represented in the thesis of Sadler.

The woman should be placed as for the application of the forceps; the bistoury, wrapped with a small linen roller to within a few lines of its point, which Baudelocque guarded with a small ball of wax, is directed along the palmar surface of one or two fingers of either hand, previously introduced into the vagina, and so on to the head which is to be opened. To insert the scalpel, a fontanelle, or at least a suture, is to be selected, when the vertex is the presenting part. Coutouly, on the contrary, insists very much on applying the instrument to the most dependent part of the cranium, and rather upon a solid portion than a fontanelle; but this should only be done as a *pis aller*, and the other method is that which is generally followed.

When the trunk of the body is delivered, we may be obliged to perforate the bones themselves, in which case we apply the instrument to the forehead, or even to the base of the occipital bone. If the case is one of hydrocephalus, we may here imitate Delacoux, by opening the spine behind in the cervical region, or the vertebral canal, with a metallic rod. The brother of this physician has told me that he has succeeded in a similar case with a female catheter.

When the head is left in the pelvis, we ought also to endeavor to find one of the membranous spaces; but it is not always easy to reach them, and the accoucheur must then choose the bone which offers the least resistance, and which his finger can touch. During this operation, if the head be somewhat movable, an assistant ought to embrace the womb with both hands, as advised by Celsus, and push it down towards the strait, so as to steady, as much as possible, the parts about to be divided. On the other hand, the point of the instrument ought never to move, while within the maternal organs, without being guarded by covering it with the point of one of the fingers. When it is once plunged into the cranium, the incision is prolonged as far as possible, at least to the extent of an inch. Most

* Dr. Collins, of Dublin, states that 79 cases of delivery by lessening the head occurred out of the whole number of cases during his mastership of the Lying-in Hospital.—The whole number is 16,414 cases, or one in about 206 labors.—M.

commonly, we should not be satisfied with making only one incision; we ought to make a crucial opening, through which the finger may be passed so as to break up the brain, which may also be lacerated with the cephalotome itself, as Lauerjat recommends, or, as Coutouly recommends, with a catheter. As to the spoon formerly used for emptying the cranium, I have no need of demonstrating anew its uselessness.

If Smellie's perforator is selected for the operation, it is to be introduced and shut with the same precautions pointed out when speaking of the use of the bistoury; when closed, it resembles a common cephalotome; but, as the two branches of which it is composed are sharp on their outer edges when they are opened, it necessarily enlarges the incision at first made by its introduction, in direct proportion to the degree of the opening; it is then shut, to be opened again in another direction; after which, it may be made use of to reduce the brain to the consistence of gruel.

If the disproportion betwixt the child's head and the pelvis is not considerable, and the womb still retains its energy, the remainder of the labor is confided to the efforts of the woman, and terminates with much rapidity; in the contrary case, we are obliged to resort to the employment of the forceps or crotchet. The forceps would be always preferable where it could be applied, and when the head is still somewhat firm; and provided it were not so liable to slip, and lose its hold, upon the application of some degree of extractive force. Haighton has also invented a forceps for this purpose, since modified by Holmes, which is furnished on the inside with teeth, and which represents a kind of *céphalotribe*. We will return to this directly.

§ 2. OF CROTCHETS AND THEIR USE.

Crotchets were formerly employed in almost all the cases that are now happily terminated by means of the forceps, and in an infinity of others, which, by means of turning, or the skillful use of the hand, are capable of being brought to a favorable conclusion; but their employment becomes more and more rare, as the knowledge of obstetrics extends, as well as that of all the other destructive instruments which were so much abused by the ancients. Dr. Dewees did not have recourse to it once in three thousand labors.

A. Forms.—Crotchets are of two kinds: one, terminated by a blunt and rounded extremity, or else of an olive shape, and more or less bulbous, which is proposed as a substitute for the fingers or the fillet, does not divide the parts of the child, and is applied either while it is living, or after its death, upon different parts of its body. They are constructed of various forms. It has been recommended that they should all be replaced by the one which terminates the handle of the modern forceps; but the best consist of a long piece of steel, supported by a wooden handle, and curved into an arc of a circle, the sinus of which is sufficiently open to embrace without difficulty the groin, the ham, or the axilla; when only bent at a right angle, as advised by Madame Lachapelle, they slip too readily; if bent into the shape of the letter S, or contracted in too acute an angle, they will not fit accurately to the part on which they may have to be applied. Baudeloque, Steidèle, and most of the accoucheurs of the present day, have imagined that the two blunt crotchets of the forceps might be united, so as to form a pincers with a curved end, and to be applied to both groins at once; but it does not appear that such a modification can ever be wanted. A single branch commonly suffices, and, with the exception of a few cases, the fingers are a very good substitute. The utility of the blunt crotchet, however, can scarcely be doubted when, from any cause whatever, the head has been separated from the trunk, which cannot be extracted except by acting upon the axilla; in such a case, as in breech and knee positions, the only rule that it is important to follow

is always to act upon the bend of the limb that looks to the back part of the woman's pelvis, and, in drawing down, not to lose sight of the axis of the pelvis.

The point of the sharp crotchet is sometimes round, as in the olive of the forceps, sometimes flat and triangular, as in Mauriceau's and most of the ancient instruments, so that the entire instrument is nothing more than a cephalotome with a bent blade. This point, which is single in some and in others double, may be continuous with a straight or with a curved stem, or it may resemble a hook of a chain, of greater or less length, like what is seen in Scultetus's *Arma-mentarium*; the point, which in most of the specimens is fixed, may, however, bend, and also open as in the instruments of Aitken and Saxtorph. Forceps or pincers with sharp crotchets have also been constructed; Meenard, Levret, Smellie, Baudelocque, and many others have boasted of the value of the crotchet-forceps, a model of which is to be seen in the *Museum de la Faculté*, and which is nothing more than Smellie's small forceps without fenestres in the blades, which are terminated by a triangular, sharp, and bent point. The forceps with *wolf-teeth* of Avicenna, and the dentated pincers of Rueff, ought also to be classed among the sharp crotchets.

B. *Method of Operating.*—After the performance of craniotomy, if the powers of nature are insufficient, before resorting to the forceps of Levret with three branches, and with still greater reason to the crotchet, Hamilton thought it well to trust to nature twenty-four hours at least. But Foster, who says that this method was in vogue in his day, believes it absolutely bad. Burns thinks that we ought to wait twenty-four hours before we resort to the triple forceps of Levret, and more especially to the sharp crotchet; he founds this doctrine on the circumstance that the fœtus, passing rapidly into a state of putrefaction, softens, and becomes much easier to extract the longer we wait, even admitting that it shall not be spontaneously expelled.

This practice, although recommended by Kelly, Mackenzie, Denman, Osborn, Boer, Simson, and Asdrubali, does not appear to me to be one that ought to be followed. I agree, with M. Dugès, that it is useless to protract, in this way, the patient's anguish; and besides, a labor that is already tedious cannot be with impunity protracted for twenty-four or forty-eight hours longer; and were there no other reason than the necessity for renewing the preparations for a forced delivery, which are always frightful, it ought to be rejected.

The sharp crotchet is to be applied to one of the most solid parts of the cranium, for example, to the occiput or the mastoid process, when the head comes foremost; upon the lower jaw, in the orbit, or upon the forehead, when it descends after the trunk; in short, in such a way as to prevent, as far as possible, the occipito-mental diameter from abandoning the line of the axis of the pelvis, and to retain it in its natural state of flexion. It may also be applied inside of the cranium, by fixing it on the petrous portion or the basilar apophysis; but in that case it is of essential importance that it shall not slip, that it shall not act upon one of the bones of the vault of the cranium, for by pulling them downwards it might pass through them and injure the organs of the woman. Like the perforator, the sharp crotchet ought never to be plunged into the fœtus without being guided, in some sort protected, or even covered by the accoucheur's finger. When fixed either on the interior or exterior of the cranium, the stem must be supported by the thumb, while the fingers remain firmly applied to the opposite side of the head, and the other hand applied to the handle exerts the requisite extractive power. In this way, it cannot let go its hold without the accoucheur's perceiving it at once; both the hands also act in concert, their efforts may be exactly combined, and the operation ceases to be dangerous. There is no longer any danger of those dreadful slips, which chance alone could prevent, when the operator is so rash as to pull, blindfold as it were, with a single instrument.

When one of the bones breaks or gives way, the crotchet must be again applied

upon a firmer part. Some advise that the point should be directed in front toward the pubis. Others have directed it to be applied behind, for the purpose of more easily drawing the head down through the superior strait; but it is not easy to lay down general rules on this subject; we must act in either way, according to circumstances. Should the head rise up again, strongly, whenever we cease to pull with the crotchet fixed at the back part, it would be well to follow M. Dugès' plan, and fix a second crotchet in front, while the head continues to be held down with the first; this may be got higher up, or a third instrument may be attached while the head is kept as low down as possible with the others.

To force the base of the cranium to clear the superior strait, we sometimes meet with obstacles that are excessively difficult to overcome. The bones of which it is composed do not bend like those of the vault of the cranium, and the crotchet is quite as incapable of lessening its size as the forceps. It is only by engaging it in an oblique direction that we most generally succeed in extracting it in cases where the antero-posterior diameter does not exceed two inches or two inches and a quarter.

Perhaps the *térébellum* of M. Dugès might be beneficially employed in such cases as these. This is a sort of cooper's turrel, which is capable of perforating the bones and cartilages, of breaking up the base of the cranium so as to render it flexible, and of acting as a substitute for most of the cephalotomes.

C. *When the Head has cleared the Superior Strait.*—However, when the base of the cranium has reached the excavation, the head may be taken hold of with the hands, and the crotchet is of no further use, unless it should be applied to the trunk, supposing, moreover, that the blunt crotchet when applied to the axilla should prove incompetent to the extraction.

In this, as in all cases where the head is completely separated from the body, there are only three points upon the trunk which can bear the action of the sharp crotchet; these are the spine, the sternum, and the ribs, and even the latter is a very insecure hold, so that the whole of the ribs of one side are sometimes found to give way one after the other, as soon as a certain degree of extractive force has to be employed. It is therefore particularly upon the vertebral column that we should endeavor to fix the point, and then act as we should have to do provided it were attached upon the head.

There is one single circumstance which seems to me to require the use of the sharp crotchet upon the trunk in a pelvic presentation; it is where the lower limbs have been separated from the body, or where they are wanting in consequence of monstrous conformation, or where they do not admit of a hold being taken sufficiently firm to pull the body down by them. In such cases the crotchet should be applied to the pubis, the crista of the ilium, or, what is still better, to the sacrum.*

There is no doubt that the accoucheurs of the seventeenth century considerably abused the crotchet. De la Motte says that, "whether the child presents by the head, arms, or legs, and whether it be alive or dead," one or two days' labor is enough to justify the operation. Saviard states that one of his preceptors, while using the crotchet, tore away a piece of the brain as large as an egg, and that the child cried as soon as it was born. Crantz reports a fact still more revolting.

* The crotchet is a most detestable instrument, on account of the utter want of security which every conscientious physician must feel, who is, by stress of circumstances, compelled to make use of it. In a very bad pelvis, it is more dangerous than in such as are not very much deformed; and the danger of its application becomes enhanced by every degree of diminution in the pelvic diameters. For my own part I abjure it, since I have employed the craniotomy forceps, described in the *Phila. Pract. of Midwifery*, to which I beg to refer the reader. With the instruments there described and figured, I believe it is quite practicable to deliver, *per vias naturales*, whenever the diameter is not below one inch and a half, and with a perfect assurance that the patient shall not suffer from any wound inflicted by the instrument itself. It is manufactured by Mr. John Rorer, North Sixth St., Philadelphia.—M.

The accoucheur, who had torn up the brain, seeing the child cry, killed it by putting his foot on its neck! But these acts of barbarity are rare exceptions, which the historians have, without doubt, not failed to present in their proper light before transmitting them to us. Peu, who preferred the crotchet to the *frondes* and to the *tire-tête*, uses it for the extraction of the living child. He also persists in maintaining, although he is spoken of as a practitioner of much reputation, that the crotchet, by his method, is an excellent means of acting *even on the living child*; he applied it over the ear in a case of eclampsia; the child lived two days, and the cut could scarcely be seen. In another case, the head was locked for five days, and the fœtus, which was delivered alive, did not die until the ninth day. Dionis speaks almost in the same way of the case of a *grande dame* at Versailles, where Mauriceau was superseded by another Dionis, who placed the crotchet on the occiput, and brought away a living fœtus, under the very eyes of the celebrated accoucheur. We see, then, that when well applied the crotchet may not be so destructive as is imagined generally, and that it might have been of great assistance before the discovery of the forceps.

§ 3. CEPHALOTRIPSY.

A. Baudelocque has lately constructed a forceps, the object of which is to overcome all these difficulties, and to render all the perforators and most of the sharp crotchets superfluous. The clams of this forceps are not fenestrated, and are but slightly curved; so that by being closed they may pass through a strait that does not exceed fifteen lines in its small diameter. Through the handles of the instrument passes a screw, which enables them to be closed with such force that the head of the fœtus will be easily reduced to any desirable dimensions without exposing the woman to the least risk. This instrument appears to me to be an ingenious one. We find something analogous to it in the *brise-pierre* of Lecat, and in the work of Assalini on different obstetrical instruments. Delpech has also claimed the idea. We see also, in the thesis of Ordinaire, the description of a forceps with large blades having teeth on the inside, and carved, employed by Cliet of Lyons, and having the same object. Oslander also speaks of a pair of forceps, by the aid of which he could easily reduce the head an inch or more. Bodarous says that Columbus imagined a similar one in 1828, which had, besides, the advantage of being substituted for the ordinary forceps in practice. In fine, they say that, for many years in England, Holmes replaced the craniotomy forceps, or the compressors of Haighton, or of Davis, by a forceps exactly similar to that of Baudelocque. I do not think, however, that any one has proposed the crushing of the head of the dead child but Baudelocque. This instrument, which Champion names the *céphalotribe*, weighed eight pounds, and was entirely too long; but Courdon has shortened one of the branches, inclined advantageously the screw, and reduced the weight to six pounds. It is to be hoped that some means will be found of reducing it still farther, and that its use will become much more easy. The author, who has used it on three different women in 1832, again employed it in 1834, without losing any of the women; and an accoucheur known to M. Champion has not been less fortunate in an attempt which he made. On this subject a doubt arises in my mind, which I feel obliged to make known to the reader. May it not have been possible to deliver the child in any one of these cases without crushing its head?—and was there an absolute certainty of the death of the child in every instance?

In concluding, the *céphalotribe* may become a precious resource in tokology, provided that it is not applied without an assurance beforehand that the fœtus is certainly dead. Although intended to crush the head, it may be applied with the same view to the pelvis of the child.

It may suffice for all cases where symphyseotomy would have been indicated, or those where premature labor could have been easily induced. It will also take

the place of the Cæsarian operation, when the small diameters of the pelvis are not reduced to less than two inches; below this, I doubt whether anything useful could be expected from it, or that its employment would be really less dangerous than gastro-hysterotomy, or embryotomy, properly speaking.

It ought also to be stated that strong pincers may take a firmer hold upon the bones, when the cranium is opened, than all the forceps invented up to this time. Dr. Meigs, called to a woman whose superior strait measured but two inches, succeeded in perforating the cranium, and in using a curved pincers as the instrument of extraction.

§ 4. OF THE EXTRACTION OF THE HEAD WHEN IT HAS BEEN LEFT ALONE IN THE GENITAL PASSAGES.

When the head is separated from the trunk, and left in the pelvis, it almost always happens in consequence of its being badly situated at the superior strait, or because the accoucheur was not skillful enough to disengage it in time: in this case, the detachment no sooner takes place than the head becomes in some sort movable in the womb, which soon brings it to the best possible situation; a few pains then succeed in expelling it, and the assistance of art is, for the most part, unnecessary. In other cases, the decapitation of the fœtus takes place, because, having been dead for some time, it is already nearly in a putrid state. If we wait for a short time, under these circumstances, the brain shrinks, the bones of the cranium become very movable, may over-ride each other, and, although at first the pelvis might have been too narrow, the head nevertheless escapes spontaneously at last. Upon these results, and also upon the evils that have often been found to follow unskillful attempts to hasten the delivery, the English practitioners, cited above, found the precept that the expulsion of the head should be confided to the powers of nature alone; but, as the labor has already lasted too long, as in some instances it would be necessary to wait several days, and as the extreme irritation of the uterus would expose it to the hazard of becoming inflamed, and the woman might die of exhaustion before the escape of the head, it would be imprudent and unreasonable not to give proper assistance. We ought not, says M. Désormeaux, to act with inconsiderate haste; there are cases where it is proper to temporize; it may be necessary to restore the strength by means of some aliment, a little wine, or other strengthening articles. Baths and antiphlogistics, &c., may be required previously to any other recourse in consequence of an incipient inflammation of the womb or peritoneum. Besides, if the straits are not too much contracted, it is possible for the uterus to effect the delivery alone. Barbaut, who relates an example, and who has borrowed two others from the practice of Puzos and Destremeau, remarks, however, that it will not do to trust to such good luck.

In cases where the hand alone may suffice, that is to say, where the head is small, or requires to be placed in a better situation for descending, an attempt should be made to get hold of the lower jaw, then, after having brought the occipito-mental diameter into a line with the axis, it should be drawn down as far as possible, coincidently with the efforts of the womb or those of the patient.

Next to the hand, the forceps is the best and safest resource that we have; but it is not always possible to apply it, while the head is still at the superior strait, and in some cases its employment does not always obviate the necessity of having recourse to craniotomy, or even to the sharp crotchet. It is true that, for the purpose of avoiding the latter measures, a great variety of extractors (*tire-têtes*) have been proposed; but none of them can be regarded as good substitutes. The double cross of Bacqué, the *bascule* of Levret, the basiocestum of Metzler, the sling of Mauriceau, the T of Stein, the fillets of Amand, the cap proposed by M. Désormeaux, Sen., the forceps with three branches of Levret, the small piece of stick to the middle of which is attached a string, or the one made of iron fixed

to the end of the metallic rod in such a way that it may be introduced parallel to the rod, and after reaching the interior of the cranium, be altered so as to stand crosswise to it, the invention of which is attributed to Danavia, and also to Ansalini, and which has been too much praised by many authors; all of these means have ceased to be made use of at the present day. The crotchet, planted somewhere near the occipital foramen, in the upper jaw, or in some other firm part, whilst the opposite part of the head is supported with the fingers, is in this, as in some other cases, the last resource; but, nevertheless, it forms the only really efficient extractor in all cases where the hand, the common forceps, the toothed forceps, the extracting forceps, with three branches, or the crotchet forceps, or the forceps of M. Baudelocque, Jr., are either inapplicable or insufficient for the delivery of the head. In fine, I will repeat, what I have already said with Champion on the use of the forceps, that it is necessary, before making any attempt, to ascertain whether the head is retained by the uterus or by the pelvis. If it does not escape at once, because the uterus remains in a state of inaction, the hand will answer and should be introduced without hesitation; but when it is arrested by the sudden contraction of the os uteri, it is better to wait for fear of accidents and to employ relaxing measures, baths, and opiates, before resorting to mechanical means. The forceps, or the crotchet, is, on the contrary, strictly applicable when a contraction of the pelvis exists.

CHAPTER IV.

OF THE NATURAL PHENOMENA WHICH FOLLOW THE DELIVERY OF THE FÆTUS.

SECT. I.—OF THE DELIVERY OF THE AFTER-BIRTH (FOURTH PERIOD OF LABOR).

THE placenta and the membranes are, after the birth of the child, called the after-birth, and their expulsion, escape, or extraction, is (*in France*) called *deliverance*. Like child-birth, this is a natural function, and, like it, this function may be *simple* or *complex*, or, if the expression be preferred, *natural* or *preternatural*, *spontaneous* or *artificial*.

ART. I.—OF THE SIMPLE OR NATURAL DELIVERY OF THE AFTER-BIRTH.

All the phenomena of *simple delivery* are referable, 1. To the detachment of the placenta; 2. To its expulsion from the genital organs.

§ 1. MECHANISM.

First stage.—The placenta becomes detached during the progress of a labor, and especially towards the conclusion, when the waters have gone off. Being in some sort an inert mass, its adhesion must necessarily be destroyed during the alternate contractions and dilatations of the womb, unless the labor be so prompt as to require almost no effort of the organism, or unless there be some preternatural adhesions.

The cause of this detachment is found in the entire uterus, and not merely in the orbicular muscles which Ruysch supposed he had discovered. Sometimes the detachment takes place in such a way that the foetal surface of the placenta presents first at the vulva, and the blood, either fluid or coagulated, collects behind the spongy surface of the cake, which is concave, like the bottom of a bottle; sometimes it is effected gradually, proceeding from the centre to the circumference, or it may begin on the edge, and if the involucre resist long, the smooth or internal surface may become the outer one, and the blood, being confined on the outside of the membranes, does not escape until after the expulsion of the after-birth, the size of which it sometimes surprisingly augments.

At other times, in detaching itself, the placenta rolls up in the shape of a cylinder or *cornet d'oublie*. In that case, it presents by its uterine surface or by its edge to the several passages; the blood, not being confined, flows out at the vulva as fast as it is poured into the womb, and commonly ceases to flow as soon as the placenta is delivered.

Second stage.—When once detached, the placenta presses upon the os uteri, engages in the orifice, which it irritates, and the womb, which is irritated by its presence, becomes more and more constricted, contracts, and soon forces it to pass into the vagina. When there, it soon gives rise to a sensation of uneasiness, tenesmus, or bearing down, which still solicits the contractions of the womb, and brings into play the efforts of the abdominal muscles. The diaphragm and mus-

cles of the belly react upon the abdominal viscera and womb, as in the expulsion of the fœtus, and the placenta clears the inferior strait.

Some persons, and among them M. Désormeaux, divide this period of expulsion into two stages. It is true that in order to pass from the womb into the vagina, the after-birth sometimes requires so considerable a degree of dilatation of the os uteri that a particular stage might be made of it, and that it may afterwards remain so long in the passage that its entire expulsion really constitutes a distinct period; but, as these two stages are far from being always so distinctly marked, it appears to me that they may, without inconvenience, be confounded together. However, this is an affair of choice, not of necessity.

If the labor have been a long one, if the woman be strong, if the means of art have been applied for the extraction of the child, and if the womb be in a state of considerable energy, the placenta falls into the vagina and presents itself at the vulva almost immediately after the delivery of the child. In opposite cases, the delivery of the placenta does not take place for half an hour, and sometimes even for several hours. It may also happen that it shall not take place for a whole day, or even for several days. This difference is easily explained: in the first case, the ovum, which has been long detached, descends whole, along with the fœtus. The womb, contracting strongly in proportion as it empties itself, simultaneously throws out both the child and placenta. In the second, the promptitude of the delivery of the child is so great that the womb has not had time to break up the adhesions of the ovum, or to contract sufficiently. Until the cavity of the womb becomes so diminished that the after-birth fills it quite up, it may remain above the orifice. When the child has just passed through the os uteri, provided the placenta be detached at the time, and urged onwards by the uterus, nothing can prevent it from descending: but if the orifice closes before the body of the organ becomes reduced in proportion, the after-birth remains shut up as it were in the uterine cavity, and cannot escape for a considerable length of time, although its adhesions may have been broken up from the beginning.

§ 2. ATTENTIONS REQUIRED IN SIMPLE DELIVERY OF THE PLACENTA.

Although the organism generally suffices to finish the expulsion of the after-birth when it has reached the excavation, some cases are, however, observed in which it would remain there for an indefinite period, provided its escape were not promoted by artificial means. It is on account of this tedious slowness, and to relieve the woman of her fatigue and uneasiness of mind, that a natural or simple case of delivery of the placenta is scarcely ever wholly abandoned to the efforts of nature. De la Motte, Deventer, Peu, and some modern authors, are scarcely willing that we should wait for it for half an hour: according to them, if we do not act at once, the orifice closes, and may retain the after-birth, from whence accidents of greater or less severity may ensue.

A. *Exposition of the Doctrines*.—Kerckring is, on the contrary, of a different opinion, and Ruysch affirms that in fifty years' practice he had never once introduced his hand into the uterus. Hamilton says that the introduction of the hand into the uterus for the delivery of the after-birth once in many hundred times is not only useless, but extremely dangerous, and that it should not be done except in cases of very urgent necessity. Hence these two doctrines have always existed, and still have their partisans and opponents. Hippocrates conformed to the first in making use of the weight of the fœtus to detach and bring away the after-birth. Mauriceau and Dionis must have adopted it when they advised that the after-birth and the fœtus should be taken near the fire before cutting the cord. Celsus was still more rash, since he directed that nothing should be left in the womb, and that even the smallest clots should be removed

by the introduction of the hand. J. Bauhin, Bruhier d'Ablaincourt, and Le Bas have also recommended this practice. Celsus says that, while an assistant holds the child, the surgeon should draw gently on the cord with the left hand, and should follow it with the right hand up to the placenta, which he should detach, little by little, and bring away with the clots, &c. Burton pretends that this manœuvre is not only useful for the extraction of the placenta, but also for calming the cutting pains, and allowing the clots to escape from the uterine sinuses. Still taught by Chapman and Manningham, the practice of Celsus, which Richter formerly defended against Ruysch, has found at the present day a decided partisan in Jackson, who does not like traction on the cord, but who prefers the introduction of the hand to every other plan.

Levret, Smellie, and Baudelocque recommend us, on the contrary, not to act until the placenta is entirely detached, or until it presents itself at the uterine orifice. Portal maintained, long since, that it is better to wait, than to proceed too soon in search of the after-birth, and to separate it like an orange-peel, "and that we should not be alarmed if certain portions of it remain."

To search for the placenta without necessity, says Puzos, is as injudicious as if we were to undertake to seize hold of the *fœtus* as soon as the neck is dilated. Denman does not remove the placenta from the vagina until an hour has elapsed, and Lemoine is altogether of Puzos's opinion. We see, more recently, Weissenborn, although opposed by Stark, renewing the opinion of Ruysch, and affirming that it is never necessary to aid in the delivery of the placenta, but that assistance can do no good, and does harm. Mursinna, a pupil of Henckel, as well as Wigand and Chauchat, has also adopted this doctrine. Buret does not like pulling on the cord. Kuetaner pretends, on the contrary, with Mauriceau, that the placenta should escape before the division of the cord, and that he has acted thus in eighteen hundred cases without accident, while by the other method he has lost sixty-nine women out of four hundred and twenty-nine. In fine, Ingleby, who also opposes too prompt a delivery of the placenta, maintains that the practitioner should wait, and in all cases remain one or two hours with the woman, for fear that a fatal hemorrhage may come on before he can get back to her, as happened in four cases cited by him.

B. Appreciation.—Both of these doctrines, if taken according to the very letter, appear to me to be equally incorrect. The practice of the ancients, if followed without exception in all cases, would doubtless sometimes be dangerous; but I am induced to believe that at the present day we have fallen into an opposite extreme. By endeavoring to follow nature as closely as possible, the end which the accoucheur ought to hold in view has been lost sight of.

Besides, if it is proper to act as soon as the placenta is detached, I do not see wherefore the delivery should be so frequently deferred; for, except in a few cases, this detachment takes place previously to the expulsion of the child. I can scarcely conceive, indeed, how the womb can be reduced to a fourth or fifth part of its volume, without destroying the delicate filaments which connect it to the ovum. Most of the facts that are cited to show that the adhesions of the placenta continue to exist after the birth of the child, are anything rather than conclusive, and do not seem to have been properly interpreted.

I know that, when the cord has been pulled at injudiciously, it has been found to occasion the inversion of the womb; but, in the first place, this accident is a very rare one; and next, it does not prove that the union of the placenta and womb was maintained at the time; for, if such tractions are performed while the womb is soft and uncontracted, whether the adhesions of the placenta be continued or not, they occasion the woman to bear down, and it is very natural that the womb should then be inverted. The cord has often been pulled so as to break it off, so as to give pain to the woman, and make her feel a dragging sensation within, and the placenta, notwithstanding, has not been moved at all.

All this is doubtless true; but, without speaking of the pretended uterine cristas, which were formerly so much spoken of, does the womb never contract, except in a regular manner, upon the secundines? Does it not, on the contrary, mould itself, in some sort, upon the anfractuosités of the placenta, so as to make its extraction somewhat difficult. These irregular contractions, which are scarcely allowed in the school of Baudelocque, and which I am sure that I have observed many times, are now admitted by a great number of foreign accoucheurs. Ingleby, who has met with them, reports five cases, and also adduces the testimony of Douglas, Denman, Chapman, Moes, Holt, Gouch, and Kinderwood.

And, then, are we sure that the extracting force has been applied in the best possible direction, and exactly to the proper extent? Have not the faults of the accoucheur been most commonly attributed to the adhesion of the placenta?

In my amphitheatre, I have many times seen the students leave off pulling at the cord from a conviction that the placenta was not detached; whereas I had only to pull in a rather more methodical manner than they did, in order to terminate the delivery at once, and without difficulty, in their presence.

In a woman who came to be delivered at the *Hospital de l'Ecole*, and who had a flooding, the cord had already been pulled so as to break it off. I introduced my hand into the womb, and found no adhesion at all.

Being called to visit a woman, in the *Rue de la Montagne Sainte-Geneviève*, whose child had been born six hours, I learned that all imaginable efforts had been made to bring away the placenta. The physician had asked for assistance only because he was convinced that the hand must be introduced into the womb in order to destroy the adhesions of the placenta. He repeated his attempts in my presence, and I soon found he would not succeed. I now took hold of the cord, and found that there was no particular difficulty in bringing away the after-birth.

I have so frequently met with these cases of supposed adhesion; I have so often introduced my hand into the uterine cavity with the design of destroying them, when I was informed that they existed, and when in fact they had no existence; and, from reasoning, it is so difficult to admit them, that I do not hesitate to look upon their occurrence as very rare. How can we conceive, in fact, that they could give way so easily under the feeble contractions that take place after the expulsion of the child, after having resisted the violent efforts of the close of the expulsive stage of the labor?

I believe, therefore, that, if it is not prudent to deliver the after-birth immediately after the escape of the child, we ought to look for another reason for the caution than the non-detachment of the placenta; that the object of the uterine contractions and their effect are far more to push this body gradually through the os uteri and into the vagina, than to break up its union to the womb; that it is not indispensably necessary for the woman to have colic pains and dragging sensations in the loins before the accoucheur delivers her; and that there are some disadvantages in not acting so soon as a favorable opportunity presents itself.

Being, in 1823, still imbued with the prevailing ideas on this subject, I used to wait until the pains came on before I proceeded to act, and I stopped as soon as I perceived the slightest resistance; and, in the short space of six months, I was obliged to wait on one occasion ten hours, on a second twenty-four, on a third thirty-six, on a fourth forty-eight hours, before the placenta was delivered, and in the last case was even obliged, after all, to introduce the hand in search of the placenta. Since that time, I have never been obliged to wait more than one hour. For me it suffices when the womb has contracted and become hard, even although the woman have felt no pain, nor dragging sensation; and up to the present time I have had good reason to be satisfied with my mode of proceeding. The theory of Weissenborn, besides, approaches this more nearly than we would

at first think. If, of eight hundred deliveries, effected in his presence in five years at the *Charité* of Berlin, he never remarked any accident, we still cannot ascribe any merit to his special method; for he says that he never aids in the delivery, except, 1st, when the placenta is entirely detached; 2dly, when it is only partially separated, but when there is great hemorrhage; 3dly, in cases of placenta prævia; the conditions for which it is generally recommended in France and Italy.

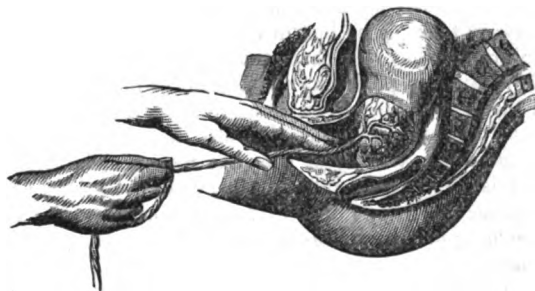
§ 3. METHOD OF OPERATING.

Thus, after having given the first necessary attentions to the child, we return to the mother, and if the hand applied to the hypogastrium feels the womb contracted with a certain degree of force, we assist the delivery of the placenta; when the uterine globe does not form, we ought to wait, or make use of the measures proper to remove inertia.

To favor the expulsion of the after-birth, the cord is to be taken hold of with the right hand, twisting it round the root of the middle and ring fingers, and then bringing it betwixt the thumb and index finger; or it is merely taken hold of with the hand after being wrapped in a piece of linen, and always, as near as possible, to the vulva; two or three fingers of the left hand are then to be slipped into the vagina, passing them under the symphysis of the pubis to the orifice of the womb, or as far as the root of the cord; as these fingers are to form a sort of gutter or pulley, I prefer three rather than only two fingers, because, as the medius forms the bottom of the groove, the index and annularis easily prevent the cord from slipping off to the right or left, whereas, if only two are made use of, the cord almost always separates them, and, therefore, it would be quite as well to place them crosswise, in the upper part of the vulva, as is the practice with some persons.

The way to derive the greatest possible advantage from them is to pass them up as far as the fetal surface of the placenta, even should that be above the os uteri, and then make them act like a lever of the first kind. The back of them rests against the top of the pubic arch, and while the other hand is drawing the cord along the axis of the inferior strait, they are pressed against the root of the cord; then by a sort of see-saw motion, communicated by the gradual rising of the wrist, they force the placenta along from above downwards and from before backwards, towards the point of the sacrum, and in the axis of the superior strait.

Fig. 25.



Mode of extracting the placenta.

This stage of the operation is the most delicate, the most important, and most difficult to perform well. The womb is sometimes so bent forwards that, if the fingers do not push the cord almost directly backwards, the placenta remains

immovable; at other times, they must be directed a little to the left or right, because the os uteri is deviated more or less to one side or the other; the axis of the womb, besides, presents a thousand shades which it would be necessary to apprehend, and which practice alone can enable one to recognize. This is the reason why a *delivery*, deemed by one accoucheur to be impossible, will often be quite a simple case to another person; and why this operation, in appearance so easy and unimportant, deserves, notwithstanding, the most minute attention from those who desire to perform it well. Should the pulley (composed of the ends of the fingers) be not well placed; should the lever represented by the fingers be not well situated, or not act properly, the after-birth, from being arrested by the upper edge of the pubes or the posterior surface of the symphysis, would not come down; the whole of the power would be directed upon the root of the cord, which would certainly break, or upon some part of the uterine orifice, whence the dragging and pain which give rise to the idea of preternatural adhesions. Columbus evidently labors under a mistake when he affirms that the fingers of one hand placed across the cord, in front of the vulva, forms a pulley sufficiently far back to put it in correspondence with the axis of the pelvis while it is drawn on with the other hand.

Be this as it may, when the placenta has come down into the vagina, the fingers of the left hand should be continued in the same situation they occupied before, but merely so as to favor the escape of the membranes which might not have cleared the os uteri, and to form a sort of inclined plane, along the inferior surface of which the whole after-birth might glide while pulled by the right hand along the axis of the inferior strait. In this way, the hand that holds the cord may be raised upwards without fear of being embarrassed by the pubic arch, and we avoid being stopped by the inferior surface of the perineum; which is an inconvenience frequently met with when the placenta is pulled along in what is properly called the axis of the strait, rather than in that of the vulva.

As soon as the after-birth appears at the vulva, the left hand is placed underneath it, crosswise, and supine, in order to sustain it; the right hand, in pronation, takes it with the ends of all the five fingers, and rolls it four or five times round, drawing it moderately and slowly downwards; without these rotatory motions the membranes might separate from the placenta, and remain within the female organs, while if twisted in this way they are collected together and resemble a rope, and become easy to extract.

During these various manœuvres, the womb rarely fails to contract with more or less force, and seems to assist the accoucheur; the woman herself is generally induced to make some efforts as soon as the placenta has descended into the vagina, and these efforts, rigorously speaking, would suffice to terminate the delivery, provided they always took place; but, in reality, they are not very necessary, and may often be injurious: they only favor the expulsion of the placenta indirectly, and are capable of directly producing the descent or inversion of the womb; the woman ought, therefore, to be urged to moderate rather than enforce them; it would not only be useless or ridiculous, but also in some cases very dangerous to administer sternutatories, as Guy de Chauliac recommends after the custom of the Arabs, or advise her to blow into a bottle, or in her hands, or on to a grain of salt to hasten the delivery; for, if ever such measures have any effect, it is merely by occasioning certain succussions, or those straining efforts that I just now was condemning.

The extracting force necessary in this operation ought never to be carried so far as to rupture the cord: if the placenta resists, the cause of it ought to be sought for in the direction of the orifice, its closure, &c.; we should wait, or else pull in another direction, and be assured that force is never necessary to enable us to triumph over such obstacles.

It is recommended that the after-birth should be examined as soon as it is

delivered, to make sure that no part of it is left within the genital organs. It will be well to follow this advice, no doubt, whenever the delivery has been attended with some difficulty, or any peculiar circumstances; but in other cases, it would be puerile to trouble one's self about it, especially considering that, even should some small pieces of the placenta or shreds of membranes be left in the womb, we should not be authorized on that account to introduce the hand in search of them, unless of large size. Puzos, who, in the beginning, recommended the hand to be carried into the womb as easily as possible, in order to assist the woman without any risk, does not blame Mauriceau the less for having said, in 1712, that the placenta should be delivered as soon as the infant escapes, for fear that the womb should contract on it; or Clement, who does the same, only because he wished to show the child at once to the assistants, but did not like to leave the woman before having delivered the placenta. The same author says that, if any portions of the placenta are left behind, they will escape of themselves; and, if any accident happens, it would depend rather upon inflammation than upon the bits of the after-birth left in the womb.

ART. II.—COMPLICATED DELIVERY OF THE AFTER-BIRTH.

Inertia, hemorrhage, convulsions, syncope, the rupture of the cord, preternatural adhesions, an encysted state of the placenta, excessive size of it, and a spasmodic contraction of the os uteri, constitute a number of accidents which sometimes complicate its delivery, and require that we should hasten or protract the term of its exclusion.

It is, indeed, with complicated delivery of the placenta, as with preternatural labor; its proportions vary according to the accoucheur. Smellie maintains that it is not met with more than once out of fifty or one hundred cases, and Merriman says that it occurs once in seventy-seven in poor, and once only in three hundred cases in private practice.

§ 1. INERTIA.

Inertia of the womb, after delivery of the child, is more particularly observed to happen in women who are weak and exhausted by flooding or the fatigue of a protracted labor; it is also met with after too sudden a delivery of the child, and in these different cases it requires a caution which is peculiar in each. Sometimes the proper remedy is a little good wine, sometimes a little light and analeptic aliment, at others rest; but it is always useful to excite the womb through the hypogastrium, by rubbing and pressing it with the ends of the fingers, and even by compressing it with a certain degree of force, alternately from above downwards, from side to side, and from before backwards, as if with a view to *mass* it, and oblige it to contract its dimensions. Irritation of the cervix, recommended by Levret, may be tried. De la Tourette advises the introduction of the finger into the anus, and advocates particularly traction on the hair of the *mons veneris*.

Pulling at the cord, if attempted previously to the cessation of the inertia, would hazard the production of an inversion of the womb, less, perhaps, in consequence of any remaining adhesions of the placenta, than from the direct pressure of the abdominal viscera upon a soft and uncontracted bag. Transmitted to the internal surface of the gestative organ, they might, also, invite an affluxion of blood to it, and give rise to hemorrhage. They must therefore be dispensed with, unless some serious accident obliges us to act otherwise. Thus, inertia of the womb ought to be classed among the complications which retard the delivery of the placenta; and when continuing, or resisting the means pointed out, the introduction of the hand into the uterus is the best remedy, and ought soon to be attempted in the manner which will be pointed out in the article on hemorrhage, or adhesion of the placenta. Injections of alum, vinegar and water, and

secale cornutum, employed three times with success by Maurice, should not be preferred to it, even after the escape of the after-birth.

§ 2. EXCESSIVE VOLUME OF THE PLACENTA.

The *volume* of the after-birth is in some instances the only cause that retards its expulsion. But this excess of size is often more apparent than real, and depends on the blood collection behind the membranes. I have met with two remarkable examples of this kind; in one, the placenta formed so large and round a tumor in the lower part of the vagina, that the midwife at first mistook it for the head of a second child; in the other, it hung in part without the vagina as a large and livid mass, at which the accoucheur was frightened, as he took it for an inversion of the womb. It appears, moreover, that this occurrence is not very rare. Haighton and Blundell each relate a case in which the clots, arrested in the vagina by the membranes, caused them to imagine the presence of a second child. Schmidt, who relates a case of the same kind, says that he also mistook the tumor for an inversion of the uterus. The placenta sometimes presents an enormous size. The accouchement of Madame D. gave me an opportunity of taking away one which weighed two pounds, and which was more than two inches thick in many places. Carus speaks of a hypertrophied placenta which weighed two pounds and a half, while the child at term weighed but three pounds and three quarters. Stein says that he has delivered one weighing six pounds, and another three.

Where the placenta is really too large, moderate and skillful tractions almost always suffice; if not, we must wait, and the natural retraction of the uterus at last renders its extraction easy. In the second case, which is the most common, if the contractions of the womb, and the force carefully exerted upon the cord, are inefficacious, the membranes may be torn, or the placenta itself perforated with the fingers, and a passage made for the fluids behind them.

We should, moreover, have reason to suspect the existence of this state of things should the womb be found to preserve a larger size than common above the pubes, although not deficient either in firmness or energy. Were the after-birth already in the vagina, the diagnosis, and the application of suitable means would be too easy to be spoken of at greater length in this place. Upon the whole, excessive volume of the appendages of the fetus scarcely constitutes one of the accidents of *delivery*, unless, indeed, it be coincident with some other complication.

§ 3. CONTRACTION OF THE OS UTERI.

I may say the same of the *spasmodic contraction of the os uteri*. In fact, it is difficult to conceive that an opening, through which a child has just passed, can contract spasmodically to such a degree as to oppose the escape of the placenta. To admit such an obstacle, we ought, which is not the case, to have some very authentic instances of the kind.* Besides, as it is not the nature of spasm to persist, we might, should such a case occur, prefer to wait for a time, and be content with administering some composing or antispasmodic medicines, according to circumstances.

* A spasmodic closure of the orifice of the womb after delivery is a very common consequence of the use of ergot. It has so frequently followed the administration of that medicine, that it constitutes, for me, one of the objections to its employment. I have, on several occasions, been obliged to dilate the os uteri by the introduction of the whole or one-half of the hand, in order to admit of the escape of the placenta, which I found completely detached and compressed by a contracted womb.

I may take this opportunity to say, that when the placenta does not come off in an hour after the birth of the child, there is little hope of its discharge being effected in two hours, or four, or six—and that it is better to remove it at most in an hour after the child is born.—M.

It is evidently the *natural*, but *somewhat precipitate closure* of the os uteri, which has been described as the spasmodic contraction. Considered under this point of view, it is a circumstance deserving of attention. When the delivery of the child is completed, the os uteri in general contracts more speedily than the body of the organ, and if in this case we endeavor to deliver the woman before the fundus is prepared to overcome the resistance of the orifice, the placenta passes through it with difficulty, which may induce a belief that it is spasmodically contracted. Besides, the contraction of the superior part of the neck of the uterus may even have this effect, for it is as common as that of the inferior opening is rare. We may even say, and Bardow agrees with us, that the retention of the placenta is most frequently dependent upon this cause. Its contraction may take place even two or three inches above the vaginal orifice, as Madame Boivin has proved on the dead subject, and offers a resistance which Frank compares to an iron girdle. Millot relies, doubtless, on this remark, when he states that the neck, entirely passive during labor, only contracts after it is over.

A bleeding from the arm where the woman is strong, and there are any signs of irritation; emollient or slightly narcotic injections; the belladonna ointment, or even a bath, if she is very nervous, weak, or has a vivid sensibility of the sexual organs, and when there are any indications of the approach of convulsions or flooding; patience, and gentle frictions upon the hypogastrium, should no accidents appear, are the measures that may be required by such a state as we have indicated: it is only when pressing and grave circumstances arise, that we are allowed to introduce a finger into the orifice to dilate it, while with the other hand we pull gently at the cord. Bardow never found that the hemorrhage authorized him to overcome, mechanically, the contracted circle.

The retention of the placenta, which, according to White, is favored by pulling on the shoulders when the head of the fœtus has escaped, may, indeed, belong to the different causes of the contraction of the os uteri. Glasspole speaks of a case in which the placenta was arrested by the upper portion of the limbs, which extended towards the fundus of the uncontracted uterus. I have seen something very analogous in a woman under the care of Madame Aillot. The after-birth was retained above the os uteri by a prolongation of the fœtal envelopes rolled into a cord. By judicious traction I succeeded in delivering the whole without breaking them. A clot of the size of an egg enveloped in the membranes was the cause of the accident. I have since collected two similar cases. It was probably the same in the case where Ramsbotham and Ingleby saw the placenta in the vagina, but hanging, as it were, by an apparent adhesion to the neck of the uterus.

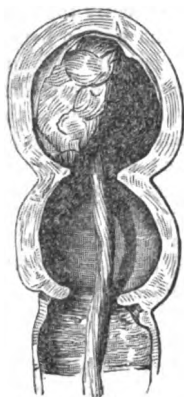
The decoction of senna, which Fagg gives to hasten the slow delivery of the placenta, would not be useful unless the uterus appeared to be atonic. I should prefer foot-baths, and frictions along the thighs, praised by Berdot and G. De la Tourette.

§ 4. ENCYSTED PLACENTA.

A. Mechanism. The *encysted state of the placenta*, which Solingen calls *hernia of the after-birth*, has not been understood in the same manner by the different authors who have spoken of it. Levret never saw but one case of it, to which he was called by a midwife, who supposed she was treating a case of rupture of the womb. According to that author, the encysted state of the placenta is occasioned by that portion of the womb which corresponds to the placenta remaining in a state of inertia, whilst the other parts of the organ contract with more or less force after the birth of the child. Simson, on the contrary, attributes it to the simple tendency of the womb to recover its primitive shape—a tendency which causes the internal orifice to produce, instantly, a real strangulation,

above which is found the after-birth enclosed within the cavity of the body, as if it were in a small cell, while the cavity of the cervix remains open below.

Fig. 26.



The hourglass contraction of the womb.

Plessmann has reproduced the idea started by Levret, but he has modified it: according to his view, the womb must be much more highly irritated at those points which press directly upon the foetus than those which only touch it through the placenta during the efforts of labor; whence it follows that the former contract sooner than the latter, and the formation of a separate sac for the after-birth is very easy to understand. Peu seems to think that the encysting depends upon a peculiar conformation of the uterus. Some uteri are found double, as it were, says this author. The cellule is almost always on the right side, and frequently encloses the after-birth while the womb is occupied by the foetus. He met with the placenta once in a kind of purse, an *arrière-boutique*, which, according to him, was an original pouch.

Leroux and Kok maintain that it most frequently depends upon the rupture of the nervous filaments, which occasions an afflux of humors, and, in consequence of that, a spasmodic contraction of some portions of the organ. Besides, the surgeon of Dijon enters more fully into the question. He formally states that the encysted placenta is due to the womb's contracting only around it, and that the absence of the fleshy fibres about its sides assists in the production of the phenomenon.

Burns admits that the encysted placenta depends upon spasm of the uterus about the upper part of the neck, but he opposes Douglas, who attributes the spasm to improper manipulations, especially to tractions on the cord.

All these explanations may be true in some particular cases; but Baudelocque prefers Simson's theory. M. Désormeaux, relying on a fact related by Meyfeld, seems to be not far from adopting, at least in part, the view taken of the subject by Levret and Plessmann.

An encysted state of the placenta is always the result of irregular contractions of the womb, after the escape of the foetus, but I do not think that these contractions can be explained upon the hypotheses of Simson, Levret, &c. The contraction takes place immediately below the placenta, or about the root of the cord. In some cases, also, it takes place on certain parts of the placenta which are thin, soft, and in rolls, so that the uterus is as if divided into many cavities, each containing a portion of the after-birth. All the known facts agree with this idea. In the case stated by Burton, the cord which had been broken was found to be strangled at its root by an opening which scarcely admitted the finger. Denys, who also explains the accident by the irregular contractions of the womb, says that the hand comes against an opening which can scarcely admit the index finger before it enters into the cavity where the placenta is. We see, then, that the uterus appears most frequently strangled as a gourd or calabash above its neck, as in the hourglass contraction of the English, as we see in Simson's case, in one of Girard's, and in that which I once met with myself.

The cases of several contractions are not more difficult to understand, and are, besides, far from being rare. In a woman to whom I was called by Madame Bevalet, the internal orifice of the cervix offered but a feeble resistance, whereas, a little higher up, I found a very decided constriction, and after penetrating into a cavity situated on the left side of the womb, in which cavity a greater part of the placenta was contained, I was obliged to pass through another stricture, to get to the fundus and right side of the organ, where the remainder of the after-birth

was retained. In another woman, who died at the *Hospice de l'Ecole*, I found the uterus so moulded upon the placenta, that it was divided, as it were, into five shallow cells, and which evidently depended upon the protuberances formed by the corresponding cotyledons of the after-birth. If the placenta were solid and even, like the head, the womb in contracting would necessarily retain the form of an ampulla; but the cotyledons in the process of the detachment may separate from each other, and the placenta would then offer more resistance in some parts than in others; so that the uterus soon divides into several compartments or divisions more or less distinct from each other, in the same way as it is found to accommodate itself to the form of the head, of the shoulder, the breast, the pelvis, and all the projecting or contracted parts of the fœtus, after the liquor amnii has been evacuated. Besides, what accoucheur of any experience has not had an opportunity of observing, through the abdominal parietes, the womb tuberculated, more or less uneven or elongated, and not always globular or round, as it is too generally said to be? In a woman whom I delivered, with the assistance of Guillemot, it was not possible to follow the cord because it had been detached at its root, and had even brought away the whole of the amnion; the cavity of the neck was supple and high up; I passed a circle, moderately contracted, and reached a portion of the placenta in a cyst which I, at first, mistook for the uterine cavity; the left hand applied on the hypogastrium felt the uterus divided, as it were, into two tumors, one of which extended towards the right flank. I passed my hand into the second circle which was directed towards the right side, and afterwards into the cavity which contained the principal portion of the placenta, which was afterwards easily detached and extracted. Wigand says also that he has seen a placenta retained by two different spasms of the uterus.

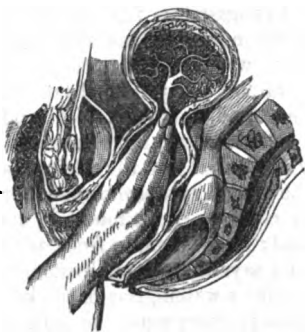
However it may be, the cyst may be formed by the fundus of the uterus, as supposed by Simson and Baudelocque, and then the organ approaches more or less to the shape of a calabash; sometimes, on the contrary, it is found to be upon one side, as was observed by Levret and Barbaut; and, again, in front or to the rear, and at points of different height. Le Roux says that, in one instance, the placenta was encased in the fundus of the womb, like a watch-glass in the lid. But such a case has not been noticed since; and there is every reason to believe that the author might have been deceived by some peculiar circumstances. M. Herbin must have been mistaken also, when he thought the after-birth was encysted in the Fallopian tube, in a woman whom he was obliged to deliver artificially. Devergie seems to me to have fallen into the same error, since he believed that the placenta was simply encysted towards the angle of the womb, where it had been at first inserted. It may be even possible that the whole of the organ, except the cyst, may be completely relaxed. The example which is reported by Herbin is remarkable because this portion was inverted and projected into the vagina. Girard says that, in a case of this kind, the accoucheur took the relaxed portion of the uterus for the placenta, and had the courage to pull it away. Madame De Lunel, who, as Guillemot remarks, seemed to have well understood the mechanism of encysted placenta, observed it in a case of multiple pregnancy. To the first placenta there was no obstruction, and it was only when that of the second child was searched after that the contraction occurred.

The placenta, moreover, may be enclosed wholly or only partially within the accidental cell; it is sometimes strangulated by the circle of the cyst, so that one portion of it may remain free in the cervix, while the rest of it is in some sort imprisoned above, in one or more cells of the body or fundus of the womb. Consequently, we may admit, as Guillemot proposes, a *complete encysting* of the placenta in those cases where it is absolutely shut up in the uterine cells, and an *incomplete encysting* in cases where it is simply surrounded by the contraction; and I think that it would be well to add *multilocular encysting*.

B. Signs and Treatment.—To have understood what has now been said in relation to encysted placenta is sufficient to enable one to guess at the signs of it. The treatment demanded by the case differs according as it is or is not accompanied with complications. If there be any complication, the contractions of the womb alone suffice to make them disappear; these are to be solicited by means of frictions upon the hypogastrium, and judicious pulling at the cord.

In fine, there ought to be no haste; we must wait. In spasmodic contraction, Hamilton found nothing preferable to forty or fifty drops of the tincture of opium. If there is any threatening appearances of hemorrhage, convulsions, &c., or if the safety of the woman appears to be in any way compromised, we must, on the contrary, make haste to act. The fingers are to be introduced one after the other into the mouth of the cyst, which is to be dilated gently and carefully, and afterwards passed by the *whole* hand in search of the placenta; should there be a second opening, it is to be treated like the first, and in all cases the cord is a sure guide to the after-birth, which is detached and separated by passing the fingers, flattened, between it and the uterus, and which is lastly extracted by pushing it with the palmar surface of the hand down into the top of the vagina.

Fig. 27.



Mode of dilating the strictured part.

It has been remarked by Crantz, and I have had occasion to remark the same thing myself, that the pain caused by the introduction of the hand into the part of the uterus that remains soft, sometimes causes the encysting to disappear. This arises from the cyst, now taking on contraction, &c., opening itself the circle which encloses the after-birth, just as the body of the womb dilates the neck at the moment of labor. Should the placenta be found only partially encysted, we might, after dilating the mouth of the cyst, dispense with going any further, take hold of it with the fingers, and immediately extract it. But it is, in general, both a surer and quicker method to go into the very cavity of the cyst itself; this is the only way of ascertaining correctly the condition of the parts.

In a case of spasmodic contraction, M. Sazie says he found the placenta puckered up, and, as it were, strangled in its centre. A polypous tumor of half the size of a child's head occupied the bottom of the cyst. It is well understood that, during this operation, the hand that remains outside shall be employed in supporting the fundus of the uterus, inclining it to either side, and depressing it towards the one that is within the organ.

§ 5. RUPTURE OF THE CORD.

The *rupture of the cord*, in itself considered, does not complicate the delivery of the placenta except by rendering the usual tractions impossible; it may be prevented by ceasing to pull as soon as there is any threat of its giving way; but it can only be remedied by going in search of the placenta with the hand, and as long as there is nothing to fear for the woman, this recourse is unnecessary, and we ought to trust to the organism itself. It is particularly apt to take place when the cord is inserted near the circumference of the placenta, or when its vessels divide too soon, and separate like the rays of an umbrella upon reaching the placenta, as in two late cases quoted by M. Benckiser, from M. Tiedemann. In the first case, the efforts concentrate almost wholly upon the root of the cord, which yields before they can be transmitted to the after-birth. In the second, the vessels are weaker than if they were united together. Further, as

the force cannot act equally upon them all, they break very readily one after the other.

Moreover, the rupture of the cord may be caused by the escape of the fœtus. If the cord is too short, or, if it encircles the neck, breast, or any other part of the body, the quick expulsion of the child may break the cord either near the placenta or the umbilicus. The laceration extended down to the peritoneum, according to De la Motte, in the case of a woman who was delivered while standing up. This accident happens quite frequently when the woman is delivered quickly, without being able to get to bed. In the case reported by Canole, inversion of the uterus took place at the same time, and the woman died suddenly. MM. Repiquet, Dupasquier of Lyons, and Meirieu have each published a case, where no danger resulted, not even to the child, and where there was no hemorrhage. Columbus states a case of rupture of the cord, in consequence of the rapid escape of the child, when no accident happened. After all, whatever may be the cause, we should not hesitate to introduce the hand for the removal of the placenta, if the rupture of the cord is accompanied with any accident, which is likely to prove serious.

§ 6. ADHESIONS.

The morbid or preternatural *adhesion* of the placenta may be either total or partial, slight or intimate.

A. *Causes and Signs*.—The ancients, Smellie and others, refer it to a scirrhus state of the womb or after-birth; many modern writers have preferred to attribute it to inflammation. But proofs are wanting on each side of the question. I have seen the placenta hard, thick, and yellowish, having lost its spongy appearance, sometimes in a few points, sometimes throughout the whole extent of its uterine surface; I have seen it full of homogeneous masses, as large as nuts or partridge eggs, hard, and elastic; but, in all these cases, the adhesions, instead of being stronger, were much weaker; although rugose and tuberculated, its surface was smooth, and exhibited no trace of any laceration. I have also met with the yellowish alteration, the *placentas gras* as they are called, and almost all the alterations pointed out by M. Brachet of Lyons, and M. Gendrin; but, in common with M. Desormeaux, I have never observed any preternatural adhesion to accompany them. Besides, I have not found, by consulting the authors, that scirrhus has been noticed in the womb exactly at the place where morbid adhesions existed; and everybody knows that the placenta generally contracts a less intimate union with the fibrous tumors on which it is sometimes attached and developed, than with the uterus itself. A. Paré, who says that he has found sand in the placenta, and Benedetti, who pretends that he has seen worms between the uterus and the after-birth, do not say that any adhesion existed at the same time. The same may be said of Puzos, who states that he has met with saline, stony, and even bilious deposits on the external surface of the placenta.

As to inflammation, it may be admitted as a probable cause in a certain number of cases; for example, when, in consequence of a blow on the belly, a dull pain and sense of heat are found to continue for several weeks in the corresponding part of the womb, and an adhesion of the placenta exists at the period of delivery. But these phenomena often continue during the whole course of a pregnancy without any adhesion taking place; and, indeed, adhesions are most frequently met with without any such previous symptoms having been noticed. Moreover, it is known that the special character of inflammation of the mucous membranes is to augment their secretions, and to terminate but very rarely in adhesions of their surface to the bodies with which they are in contact. Prudence, therefore, requires that we should wait for some new researches, before we pronounce upon this point of pathology.

When the adhesion is partial, it occupies sometimes one portion, and at others

the entire circumference of the placenta; sometimes, on the contrary, the edges of the cake are free, and it adheres to the womb at one or more points of its surface, or at its middle. When the adhesion is general, a circumstance but rarely noticed, but which has, notwithstanding, been seen by several practitioners, and particularly by M. Désormeaux, it exhibits different degrees of the affection like the preceding case. It may, in certain cases, be overcome by simply pulling at the cord, without the necessity of passing the hand into the womb; in other instances, it is so strong that the tissues seem to be confounded together, and it is impossible to overcome it without tearing the parts.

Signs.—I will not, with M. Désormeaux, say that we can recognize, but that we may suspect, or have a right to suspect, the existence of a morbid adhesion of the after-birth, when, notwithstanding the repeated contractions, hardness, and globular shape of the uterus, we find, by passing the finger up through the os uteri, that the placenta does not present, and does not yield to tractions suitably exerted upon the cord; by remembering, besides, what has already been said, viz., that a morbid adhesion is extremely rare, we ought to avoid confounding it with the cases in which the extraction of the secundines is rendered difficult by some other cause.

B. Treatment.—Two very different modes of proceeding have been followed by accoucheurs in cases of pathological adhesion of the placenta: some think it ought to be left wholly to the natural efforts; others, on the contrary, think that we cannot too soon take measures to overcome it. On the one hand, it has been thought that, by allowing the after-birth to remain for an indefinite period within the uterus, we expose the woman to the dangers of flooding, or convulsions; that, by becoming decomposed, by putrefying, this substance must act injuriously upon the whole system, and particularly upon the genital organs and peritoneum, giving rise to fever of a bad character. On the other hand, it is asserted that these accidents are far more the effect of ill-timed manoeuvres than of the protracted presence of the placenta. Haller, Sandifort, and M. de Saint-Amand have reported cases of wombs that had been lacerated, inflamed, or mortified, in consequence of attempts to break up preternatural adhesions of the placenta; the afterbirth has been known to remain two, four, six, eight, fifteen or thirty days, or for months together, within the genital organs, without causing the smallest accident. If it becomes putrid, the lochiæ wash it away piecemeal, and its absorption may be easily prevented by means of injections. In fine, the dangers which, it would seem, ought to follow its forced detachment, have appeared to be much greater than those that might be involved in its retention for a greater or smaller period of time. We also see Jacobs insisting that midwives should not be too anxious to assist in the delivery of the placenta, but that it should be left to nature, even in cases of hemorrhage, when its extraction presents any difficulty.

There is reason on both sides of this question: Although it is undeniable that the placenta may in some cases remain for several days in the womb without causing any accidents, it is very frequently the cause of very severe ones. It has a thousand times been seen to carry the woman to the very brink of the grave, when all the bad symptoms disappear as by magic, immediately upon its expulsion. Were new proofs of it wanting, I could refer the reader to two cases recently published by M. Goupil, and might cite those that have fallen under my own notice.

Whether the placenta is adherent or not, neither the whole nor a part should be left in the uterus when it is at all possible to remove it. Denman, who says that he has seen it escape, after fifteen days, without the occurrence of any accident, has also remarked that in other cases death was the consequence. Barbaud also speaks of a woman who perished in this way on the twelfth day. White reports examples which leave no doubt on this point. And Kok, of Brussels,

establishes by cases that a placenta retained for a long time exposes the patient to hemorrhage, putrid fever, and death. Burns holds the same language. Therefore we should be very careful how we leave the woman before the complete delivery of the placenta, which should be sought for with the hand, if it has not entirely escaped at the end of an hour. Perfect reports two fatal cases in which it was retained; in one of which it was allowed to remain until the eighth, in the other until the fifteenth day. Ingleby, who opposes too prompt delivery of the after-birth, is also obliged to admit that the retention of a portion of it is always an unfortunate circumstance, and that it often proves fatal. He even gives a case in which the woman died on the fifteenth day after delivery. Osiander, who relates a case of abortion in which the placenta was delivered in a perfect state of preservation sixty-five days after the escape of the fœtus, does not prevent his compatriot, M. Kilian, from maintaining that, if the placenta does not follow the child in one hour, it becomes necessary to think of removing it, and that, should any accident whatever occur in half an hour, the operation should be performed without delay.

M. Emery communicated to the Academy of Medicine, the 25th of June, 1827, facts equally confirmatory of this doctrine. Evrat was called to the wife of a physician to take away the placenta on the seventh day after delivery; she died. In another case, the hemorrhage did not cease for eighteen hours, and then only after the extraction of the placenta. In a third, putrid fever occurred on the sixth or seventh day, of which the patient died. The same thing was observed at the *Hôtel-Dieu*, in the service of M. Guénau de Mussy, in the case of a woman who was in an adynamic condition when the placenta was extracted on the sixth day, and who died on the nineteenth. Pus was found in the Fallopian tubes and in the uterus, the sinuses of which were apparently in a putrid condition. I have myself met with a case in which it would never have done to imitate Barbaut, and knowingly leave a portion of the placenta in the womb.

A woman, whose first labor had been difficult in consequence of the mal-presentation of the child, and who during the course of the second pregnancy suffered from bad health, was delivered, however, this time, without any assistance. The cord was thin, and its vessels diverged as they approached its root. The placenta, which was thin, pale, and with distinct cotyledons, came away with difficulty; it seemed to me, indeed, that one of these portions remained within the uterine cavity. Violent pains came on the next day, which would pass off to return at the end of a few hours. After the occurrence of the milk fever, the patient was threatened with convulsions and peritonitis. At last a solid mass was detected in the neck of the womb, which was only extracted upon the eighth day. All difficulty on the part of the genital organs ceased, but symptoms of softening of the brain were substituted, and placed the patient in the most imminent danger. Morlanne relates the case of a woman who was only delivered of the placenta at the end of fifteen days; but she remained, up to this time, a prey to different accidents. In another, the placenta did not escape until the end of three months, during the whole of which time hemorrhage took place.

The best practice, as I conceive, is that which consists in carrying the hand into the womb, rather than leaving any portions of the placenta undelivered, and in all cases bringing away such portions as soon as possible. I know that pieces of the placenta have been often left in the womb. Smellie and Pasta have already cited cases. Bouquenod has seen the delivery of the placenta effected at the end of the eighth month without any danger. Guillemeau speaks of a portion of the after-birth which did not prevent a conception from taking place at the end of four months, nor the accouchement at term. We see also, in the *Revue Médicale*, that a placenta, retained in consequence of the rupture of the cord, was only expelled after remaining four months, and on the occurrence of a slight hemorrhage. In the case of a woman observed by Pirondi, fecundation took

place notwithstanding the presence of the placenta of a previous abortion, which was not expelled until many months after the new ovum. But these are but fortunate exceptions, on which we can no more rely than on cases of absorption, which will come up hereafter.

As a foreign body, it irritates the womb, invites the blood to it, and is a constant cause of floodings, nervous affections, and pains of all kinds. The acrimony which it produces in putrefying, and the odor which it develops, cannot be matters of indifference in a majority of women; the sanies and putrescence which result from its decomposition will not remain in contact with the interior of the womb without penetrating, by means of imbibition or absorption, in greater or smaller quantity into the veins of that organ; and who will venture to affirm that it would not under such circumstances be dangerous? Although it has happened that the hand, by being introduced within the uterus, has sometimes lacerated the parts of the woman instead of detaching the placenta, it must be attributed to a want of skill in the accoucheur, and not to the operation in itself considered. Besides, the question is not whether we shall tear away, or destroy at all hazards, the intimate adhesions of the placenta, whether we shall *peel it off*, as the ancients did, but merely whether we shall carefully separate it and extract it whenever we can do so without lacerating the uterus. Upon this point I agree with M. Duchâteau; and, unless the child has been delivered for a long time, it would be a mistake to suppose that the introduction of the hand must be very painful and irritating to the womb. Is it reasonable to fear any bad effects from the gentle frictions of the fingers, or moderate tractions exerted with the hand upon an organ that has been for several hours contracting without any inconvenience, and with much violence before? Of a hundred and sixty-three women delivered of the placenta artificially, E. Buk cites but six unfortunate cases, while thirty died out of thirty-five who were left to the efforts of nature. Riecke says that, with him, only sixty-two deaths took place of five hundred and sixty-eight forced deliveries of the placenta, whilst twenty-nine proved fatal out of thirty-two in which nothing was done. Ulsamer says that he lost one in thirteen after its removal, and one in two when it was let alone. In fine Meissner pretends that he lost but four women, who were already worn out by hemorrhage, of a hundred and eighteen from whom he had taken it.

C. *Method of Operating.*—If the cord remains whole, we should pull at it in the way indicated when speaking of simple delivery of the placenta; when the cord is broken, we must attempt to hook a portion of the placenta itself in the fingers. Levret, Baudelocque, and all the moderns insist very much on the necessity of drawing the cord down perpendicularly to the plane of the placenta. The following comparison has been made use of. If you pull at a piece of wet paper in a direction parallel to the plane on which it is applied, you will not detach, but you will tear it, says Levret; but if you take hold of one of its edges and turn it up, you may easily detach it without breaking it. According to the last-named author, we must first endeavor to ascertain the spot on which the placenta is seated, for, if it be in front, we shall make use of the fingers arranged like a pulley, as has been before mentioned, whereas, if it be situated on the posterior part of the womb, this pulley becomes useless, and it must be carried to the right or left, provided it be situated laterally.

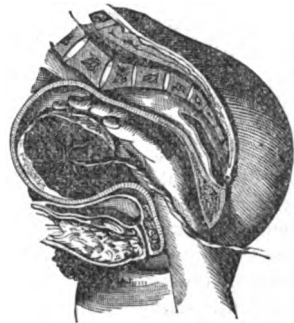
This reasoning would doubtless be very correct, provided we were acting in a free space, or if the placenta were not attached to walls of the womb, which is very much distended at the time; but it seems to be overlooked that the fingers only support the cord below the mouth of the womb; that the after-birth touches the womb, both by its spongy and its membranous surface; that, in whatever manner we may take hold of it, the cord will always be parallel and not perpendicular to the great diameter of the womb, from its very insertion till it passes through the orifice of the organ; that, by pushing it strongly backwards,

in front, or sideways, as is recommended, we compel it to rub and slide on the corresponding point of the os uteri as on the groove of a pulley, without in any way changing its relation or direction to the placenta itself. It is as well, therefore, and even better, to place the three fingers in such a way that they may act at the same time like a lever and like a pulley, and draw the cord and the rest of the after-birth down in the longitudinal axis of the womb; but as this axis may vary, may differ more or less from that of the straight, by inclining in front, to the right, or the left: as it may remain straight, or become curved, or even zigzag, according to the position, form, and direction affected by the womb, it will be consequently necessary to pull sometimes more, sometimes less towards the back or side, as I have already shown in speaking of cases of natural delivery of the placenta. It is not until we have pulled at the cord, with all proper prudence, or where the cord will no longer bear the requisite force to be applied, that we may proceed to enter the womb in search of the after-birth. Provided the cord is still not broken entirely off, we make use of it as a guide; when it is completely separated, the hand will distinguish the placenta by its greater softness, its unevenness if the external surface be touched, and provided the fingers come in contact with its foetal surface, by its polished and slippery feel, and the vascular ramifications with which it is overspread; and in all cases by the less vivid sensation experienced by the woman when the hand is pressed on it, than when pressed on the womb itself. There is generally no difficulty in this exploration for an experienced person; but by carelessness it would not be impossible to mistake the projections, sometimes presented by the interior of the womb when it is irregularly contracted, for the projections of the placenta, a mistake which in the hands of ignorant and unskillful persons would be dangerous.

When found, we should endeavor to get hold of some point of its circumference, if there is one which does not continue to be adherent; it is then detached by turning it over towards its membranous surface, or the advice given by Baudelocque may be followed: the ends of the fingers flattened out may be slipped between it and the womb; then, by carefully moving them from side to side, it may be detached just as we would separate two sheets of paper slightly adhering together. Where the adhesion is found to be general, the hand, disposed as before mentioned, is passed along the external surface of some portion of the membranes, and then gradually to the circumference of the placenta; when there, it should act as has been described. Should the circumference alone have contracted morbid adhesions, as seems to have been noticed by Leroux, and the middle portion of the cake be depressed by the blood, as Baudelocque states to have happened under his own observation, we might, after the example of that practitioner, penetrate through the placenta, and then proceed as in the other cases. When its separation is effected, the hand brings it away by pushing it down before it. We ought to take care to leave no portion of it behind, and at the same time remove all the coagula that may be contained in the uterus.

In acting thus, it very rarely happens that the adhesions cannot be safely destroyed. However, they are sometimes so firm that it is wholly impossible to make them yield. In such a case, the plan pursued by Smellie, Levret, &c., should be adopted, namely, to destroy the adhesions wherever they are not too

Fig. 28.



The mode of breaking up the adhesions of the placenta.

firm, and tear and bring away all that we can detach, and leave the remainder to the natural powers. Meenard, who introduces his hand with such freedom into the uterus, operated in this manner and strongly condemns the fumbling of those persons who are unwilling to leave the least particle of the placenta in the uterus. In peeling off the placenta, we can go no further than this, and it would be extremely dangerous to persist in endeavoring to bring away the whole of it, and not leave the smallest portion behind in the female organs.

When but a small portion of the after-birth remains, it is taken hold of in the same manner. If the neck is still soft and large, and if the accouchement is just over, it is best to carry the whole hand into the womb. Subsequently, when the body is engaged more or less in the os uteri, it will then suffice to enter the vagina and to pass the fingers up the neck to the uterine cavity. Care must be taken not to be deceived by a morbid growth or any irregularity of the neck. After a delivery at which the accoucheur has not been present, accidents have occurred which were attributed to a mass which projected into the vagina, and which was mistaken for the after-birth. Deneux ligated this mass, and afterwards excised it; it was a polypus, and the woman died. Called to a woman delivered of her first child eight days before, Bréon found that the uterus was filled with an enormous mass, although the sage-femme assured him that the delivery of the placenta had taken place; some days afterwards, a tumor as large as a child's head escaped, which, upon examination, was found to be of a fibrous nature. When the retention of the placenta is complicated with hemorrhage, Pitschaft likes the use of borax with an emulsion of oil of valerian. Hufeland advises injections of antimony and hydrochlorate of soda, or drawing the breasts.

If, however, it is impossible to empty the womb, or if from any cause a portion of the placenta remains, the following are the means of cure which the organism establishes, and the attentions which the female demands.

Sometimes the portion of the placenta which we have been unable to detach separates spontaneously after a few days, and escapes along with the coagula; sometimes it becomes decomposed, and comes away with the lochia; at others it is not discharged for a long time. Smellie asserts that one of his patients did not expel it until two months had elapsed, and it was then hard and quite dried up. Kerkring relates another instance where it was not passed away till full eight months. The entire placenta was not expelled before the seventh day in Barbaut's patient. M. Prost has related two cases not less remarkable: in one the after-birth was not expelled until the hundredth and third day; and in the other, until eight months and a half after the birth of the child. At the termination of a first pregnancy, portions of placenta were passed away in the course of four, six, and eight months, and then a new impregnation took place in the woman, of which M. Shortland speaks. In a case of *fausse-couche* of two months, observed by Madame Langel, there was neither delivery of it nor any accident. Another impregnation took place, and a blighted placenta, apparently grasped by the cervix, and which was felt at the upper part of the vagina, was expelled some time after with the second ovum.

Although its presence may be found not to give rise to any accidents, some precautions ought nevertheless to be taken in regard to it: for instance, the fingers should from time to time be introduced into the vagina to ascertain whether it be detached, and extract it as soon as it tries to engage within the os uteri. In case the fingers cannot get hold of it, recourse might be had to the *pince à faux germe* of Levret, or to Dr. Dewees's crotchet. Injections with mallows water, or barley water sweetened with honey, or even a decoction of bark, may be daily thrown into the uterine cavity, to cleanse it, prevent absorption, and bring away the detritus of the after-birth as it separates or putrefies. Perhaps even the injections which Levret and Recollin have extolled, under these

circumstances, which Puzos makes with warm water and wine in case of a hemorrhage, may be replaced towards the end, when they are simply calming, by the semi-liquid cataplasms employed by Guillon.

It should not be forgotten, moreover, that these adhesions are the result of a disease, and that, after their violent destruction, the inner surface of the uterus remains in a pathological state calculated to excite some uneasiness, and that they leave behind them a sort of suppurating wound that it imports us to cleanse and heal.

§ 7. ABSORPTION OF THE PLACENTA.

Sometimes also the placenta which remains in the womb disappears insensibly, apparently by absorption. Some authors have indeed written of the absorption of the placenta for some years. A great number of examples have already been reported. The case of a woman mentioned by Guillemeau, and who became pregnant at the end of four months without having passed the old placenta, belongs to this class. Planque gives the history of a woman of Berri, who was not delivered of the placenta, and who was cured of a melancholy by a fit of passion. Nægèle and Salomon have each published an interesting memoir on this subject, giving very remarkable cases which occurred in their practice, or that of other accoucheurs, as, for instance, of Gœlzenberger. Gabilot has also given a case; and Ingleby speaks of small portions of the placenta which were left behind. McGlover and Porcher relate the case of a woman who had had two miscarriages at three months, and who was afterwards delivered at term, when contraction of the os uteri prevented the placenta, which was adherent, from being reached; the cord and the membranes became putrid. One month afterwards, pains, like those of labor, came on, but no placenta was expelled; the os uteri appeared firm, and the uterus was in its natural condition; the health became perfect at the end of a year. Morlanne relates a very similar example. Dubel extracts a case from the German journals, and says that, in a patient attended by Burger, all the excretions became extremely fetid, but that no fragment of the placenta escaped.

In another case, Stoltz, who was called at the end of six weeks, recognized with the finger a placenta which was shrivelled up and movable; he could only extract a small portion of it, and the rest disappeared insensibly.

Deubel ascribes a similar observation to Beck, in the case of a woman who had an abortion at four months; the cord was torn away, and the placenta was retained in the uterus. Some accidents supervened, but the health was ultimately re-established, and Stoltz is convinced that no placenta was expelled.

Such a fact seemed so singular that it was at first denied, and is not even yet believed in France. Mad. Boivin, who rejects nearly all these proofs, explains pretty well how we may be mistaken on this point. Indeed, how can we admit that so large a body, one so complex and so solid, and of a texture so dense as the placenta, can disappear insensibly, and enter, molecule by molecule, into the circulation? What proof have we that the placenta, when broken into pieces, and softened down by putrefaction, does not escape from the vagina unknown to the female, and so as to deceive those who may be with her in these different cases.

I, who am convinced that we should not adopt as likely all that has been published on this subject, and who have never seen anything like it after a regular labor, nevertheless think it worthy of serious attention. It is difficult for me to call in doubt what an observer so exact and so able as Nægèle advises *de visu*. Indeed, there exist in science such extraordinary results that no one can think of disputing them. In extra-uterine pregnancies which terminate favorably, although the ovum remains within the organs, we often find the foetus completely deprived of its soft parts, and reduced to its solid tissues; the same thing has been observed in the womb itself. T. Bartholin mentions such occurrences

in cows. Joëger testifies to its existence in the bitch. Carus and Huzard have especially proved that it has often been met with in the ewe. On the other hand, experiments made by Bretonneau, and which I have repeated many times, prove that animal tissues placed at the bottom of an abscess, for example, decompose very rapidly, and are sometimes digested as if in the stomach. I will add that, in three cases of abortion which happened in 1833, I met with all the characteristics of resorption of the placenta. I attended one of the cases with Cisset. I saw the second with Caillard and Manec; and the third was at the Hospital *La Pitié*. In all three cases, a fœtus only escaped; the clots, which were carefully examined, presented not the least trace of membranes or placenta. The neck of the uterus closed up and became hard at the end of a few days, and the lochia were not very abundant. The case which I met with at the hospital was a very interesting one. The woman, who was two or three months advanced, had scarcely escaped the dangers of a severe erysipelas, when she was attacked with hemorrhage and all the symptoms of abortion. Seeing that the ovum, which projected for two days across the os uteri, in the upper part of the vagina, did not advance, I undertook to break the membranes. The fœtus, softened and semi-putrid, escaped soon after, but the other portions did not come away. I left them in place, hoping that the uterus would take on contraction, and that they would soon be expelled. I expressly enjoined on the *interne*, the religious attendant, and the nurse, to watch the patient, to preserve all the clots, to show me the linen, and to destroy nothing which came from her; yet this woman, who fell into an adynamic condition, who did not leave her bed, and whom I touched every morning, passed nothing whatever of any consistence. The blood ceased flowing at once, and the os uteri became completely closed in three days. She ultimately died, and we found the cavity of the uterus perfectly empty and entirely healthy. I met with a fourth example in the month of August, 1834. The patient was two months and a half advanced, and had suffered from profuse hemorrhage for six days when she came under my care at *La Pitié*, the fœtus having escaped two days before. On examination, I could pass the finger without difficulty into the uterus, where I came across the after-birth in the form of a mass adherent at its superior part, a fragment of which I brought away so as to establish its nature, and all the pupils, as well as myself, were convinced that it was a part of the membranes of the ovum. The woman was watched with care, and did not rise from her bed. We examined the linen every day, and I touched her many times subsequently; the hemorrhage soon ceased, and I am satisfied that the body which I at first detected did not escape. The os uteri closed without the occurrence of lochia or any fetid discharge.

Without doubt, we cannot prove from this the absorption of an after-birth at term; but, if it can be demonstrated that the placenta of the first months of pregnancy can be absorbed, from analogy we shall have no right to deny the occurrence of the same phenomenon after a regular accouchement. As to the manner of interpreting so strange an occurrence, I will not here stop, for fear that we should have to review on this point the history of the *dent d'or*.

§ 8. HEMORRHAGE.

Hemorrhage may take place before the delivery of the placenta, as a complication of any of the accidents heretofore mentioned; but it is also observed singly. Whether it depends upon inertia, spasm, plethora, or irritation of the womb, it is always a dangerous phenomenon, which we ought to make haste to combat. We see, in the thesis of M. Quesnel, the case of a woman who died with all the symptoms of an abundant hemorrhage, although a very small quantity of blood escaped, not from the uterus, but from the external genital organs, which were lacerated in several places. If the presence of the placenta is not the only cause, it at least serves to keep it up and aggravate it; we should,

therefore, be diligent in extracting it, even although there should be inertia. Some authors, however, have thought that the delivery of the placenta ought not to be hurried while the womb does not contract, unless there should be a partial detachment of the placenta. M. Lacour has lately endeavored to show that artificial delivery of the placenta can only have the effect of increasing inertia, and consequently that of producing flooding; but daily experience is opposed to this view of the subject, and the contrary opinion is generally adopted. I have no intention of repeating here what I have already said concerning the causes, signs, and general treatment of hemorrhage; but I must speak of it as one of the complications of delivery of the after-birth.

I am not sure that its mechanism has been well understood. It is improperly attributed to the non-contraction of the womb, in consequence of which the blood must flow in torrents from supposed orifices that remain gaping upon the internal surface of the organ. But is it not rather occasioned by the sudden cessation of pressure upon the hypogastric vessels, whereby the blood is allowed to rush into them with great force; or upon the circumstance that the blood must in some sort accumulate mechanically in the uterine vessels, which, being no longer supported, pour it into the empty space which a few moments before was occupied by the ovum—or perhaps on the fact that, together with these dispositions, there may be some irritating cause present in the cavity of the uterus itself?

The sudden afflux of blood, of which the abdominal aorta becomes the seat, may cause a considerable exaltation of the arterial circulation in the interior of the uterus, at the same time that the *reflux* in the vena cava causes a venous stagnation, which forces the sinuses to pour out the blood with which they are engorged into the uterine cavity in place of carrying it towards the heart.

It is by becoming hard, and contracting upon itself, that the uterus resists best this unfortunate effect of abdominal depletion, as indeed a number of authors, Mad. Boivin in particular, believe that contraction of the uterus and hemorrhage are incompatible. The blood which escapes when the uterus is contracted, says this learned midwife, does not come from the uterine vessels, but is forced out of the placenta, as if from a sponge. I know that this is often the case, but the contrary is not impossible. I have seen on two occasions hemorrhage after the delivery of the placenta, although the womb was well contracted on itself; the labor had been terminated four hours in one case, and seven in the other. It is besides an accident which is not uncommon after the first twenty-four hours. Gooch, who professes the same doctrine, has been opposed by Robertson, who maintains that the fundus of the uterus, at least, must be relaxed; but Ingleby cites, in favor of Gooch, cases which are difficult to refute.

Most of the hemorrhages after labor occur according to a law which should be understood, and which Guillemeau has well comprehended. The blood runs down, and is poured out in unusual quantities, either because the uterus remains soft and does not contract, or because it becomes badly contracted and is more or less relaxed during the intervals of contraction. If the neck or fundus, or any other point, only contracts while the remainder of the womb continues inactive, hemorrhage may take place without any difficulty, and the same thing may occur in encysted placenta or spasmodic contraction of the uterus; although the contraction may have been at first perfect, hemorrhage may after a time occur, as the uterine action may assume an intermittent character more or less prolonged and complete. Also, we see in a great number of women the womb, still excited by the effect of labor, contract with great energy immediately after the escape of the fœtus, and thus prevent hemorrhage during a variable time, then become more and more relaxed, and permit a frightful discharge to take place, as in the case observed by Morlanne. It is this which justifies the advice given by Ingleby to remain with the woman one or two hours after every kind of labor.

Treatment.—1. *Means of prevention.*—Upon this hypothesis the best means of preventing a hemorrhage would not be to rub the navel and the hypogastrium with a spoonful of brandy or Cologne water, as advised by A. Leroy, and as Faure says that he has done, but promptly to apply a pretty tight bandage to the belly, and place the woman with her head very low immediately after delivery. White exacts this position even during labor, and forbids the woman from using the least effort. An excellent preventive means, according to Clarke, consists in keeping the woman cool towards the latter part of labor, and in compressing the hypogastrium as the child escapes, and just as the uterus re-enters the pelvis. This was also the practice of Gooch. Osborne pretends that he has succeeded equally well by retarding the escape of the child after the head has once been expelled; and Evans is content with giving iced liquids with the same object. Guillemeau especially extols the infusion of secale cornutum after the rupture of the membranes, but I think that the precaution pointed out by Osborne and Clarke's plan of compression deserve at least as much confidence. One of these means, at any rate, does not exclude any other. I have nothing to say of the use of opium, of which Waller always administers a large dose after delivery, as no one in France has as yet studied its action in this point of view.

2. *Means of cure.*—After having once declared itself, hemorrhage requires the promptest assistance.

a. *To empty and support the womb.*—Should any portion of the after-birth remain in the genital organs, it should be at once taken away. According to De la Motte, death occurred once in three hundred and ninety-two cases from the presence of a portion of the placenta. The same thing would have taken place in a case related by Leroux, if the tampon had not been employed. The uterus should be emptied with the hand, as Deleurye maintains, notwithstanding the fears expressed by Blundell and Ingleby on this point.

After having extracted the placenta, if the flooding continues to such a degree as to excite apprehensions relative to the welfare of the patient, provided the womb remains soft and inactive, or a sinapism applied betwixt the shoulders has been tried in vain, we may without hesitation introduce the hand into the organ. It is more valuable, says Jackson, than the tampon, the ergot, cold applications, &c. De la Motte had well remarked that this is the most certain method of putting a stop to the inertia. Burns says the same of it. Pressure made by the hand, and in various directions upon the hypogastrium, which is landed as an important discovery in the *Journal des Savans* of 1722, can never be a complete substitute for this means of relief.

It should then be necessary that a want of contraction of the uterus after labor would be always followed by hemorrhage. After having extracted a placenta which he thought adherent, Glasspole recognized distinctly that the uterus was soft and uncontracted, notwithstanding which, no hemorrhage took place. All that I have said on compression, in the article on hemorrhage during labor, is here very applicable; M. Chevreul found it especially serviceable as accessory to the tampon. We may also make use of cold water, or oxycrate applied to the hypogastrium, lumbar region, and flanks, as Hippocrates and Van Swieten recommend. As to the removal of the blood, which collects in the uterus, by means of a sound, as Dolivera directs, it is not worth thinking of. Dr. Lee, with reason, laughs at Gooch, who directs that the hand should be carried into the womb, to serve as a *point d'appui* for that which compresses the hypogastrium, so as to simulate the action of the tourniquet, as we shall directly see that it is the aorta and the vessels of the pelvis which should be compressed rather than the uterus.

b. *Injections of oxycrate*, of pure vinegar or iced-water, which are recommended by Saxtorph; alcohol, and sulphuric or nitric acid diluted with water, with which Pasta advises us to canterize the uterine vessels; or a solution of corrosive sublimate, which M. Hohl has no hesitation of recommending; the in-

introduction of a hog's bladder, to be afterwards filled with air, water, or astringent fluids, while within the womb, as proposed by MM. Rouget, Vernet, and Lenci, would offer much fewer advantages, and expose the patient to many more accidents, and are not so easy of application as the hand. Basedow, who has also recommended a bladder filled with air as Rouget did, never, however, proved its efficacy. Cold or astringent injections, which Kock at first recommended, as also those which had been employed with success by Galen, P. Alpin, Guillemeau, and Doudement, do not deserve the reproaches which Outrepont has given to them. I doubt, also, whether we should really fear, as Cruveilhier seems to think, lest they enter into the uterine sinuses, and thus prove speedily fatal; but I think them of such a nature as likely to produce numerous chronic maladies, and that they deserve the oblivion into which they have fallen.

Supposing that medicated liquids would put a stop to the flow of blood, some practitioners have conceived the idea of dipping certain bodies into them, and of thus introducing them into the uterus. Cruikshank for this purpose made use of a sponge dipped in lemon-juice or vinegar; and the tampon, which, even after delivery, has afforded remarkable success to Leroux, although Ingleby disputes it, was almost always dipped in these liquids by him. The lemon deprived of its rind, as I have seen employed by two matrons in the country, in Touraine—such as Pasteur, after Evrat, has especially advised—may prove an excellent remedy: left in the womb, it there causes an excitation and soon a permanent contraction almost as efficacious as that produced by the hand. I think, then, that I may recommend its use, despite the ill success of Ingleby, and without being prevented by the fear of seeing it retained by the spasmodic contraction of the os uteri, as Doudement believes may occur.

But, provided there should be no inertia, we ought to have recourse to the treatment indicated in the article on Hemorrhage in General, that is, to revulsives, refrigerants, and even the tampon, which then may become, when it is well applied, a heroic remedy, as we see by the observations of Chevreul.

We may also, as Rigby is said to have done, resort to drawing the breasts. This accoucheur pretends that, if the child takes hold of the nipple, the hemorrhage ceases instantly. The well-known sympathy which exists between the uterus and the mammae renders such an effect credible: there is nothing to hinder us from making use of another person, or even of a small pup, if the babe will not, or cannot, take hold of the nipple immediately after delivery.

c. *Compression of the aorta.*—Perhaps it would be well, where the flooding is overwhelming, to compress the aorta above the sacro-vertebral angle, while waiting until other measures might be put in practice; immediately after the birth of the child, the abdominal parietes are soft, and in many women it would not be difficult to act upon the aorta with the thumbs; so that, without attaching so much importance to this measure, which has already been spoken of by Boer, Madame Lachapelle, M. Dugès, &c., as is attributed to it by MM. Tréhan and Baudelocque, Jr., I would willingly have recourse to it, should an occasion present. Since this compression has been proposed, it has been used with a good deal of zeal. It is said that Plouquet had already pointed out the process in 1797; that Budiger employed it more than twenty times; that Eichelberg made use of it in 1820; and that Siebold and Ulsamer also resorted to it before it was thought of in France. The fact is that the idea seems to have presented itself to several different persons. Schweighæuser describes it sufficiently accurately, and there are three different ways in which it may be performed. Saxtorph, for example, pressed on the womb through the abdominal walls; others, as Boer, carry the hand even into the uterus to press the aorta against the spine; and some maintain, with Baudelocque, that its calibre should be effaced above the uterus, either with two fingers, as Ulsamer directs, or with the thumb, as Tréhan did, or even with the fist, as Siebold recommends, which should be applied a little to

the left of the spine through the abdominal walls, carefully pushing aside the intestines at the same time. Eichelberg gives a remarkable case of it. We may consult, on this subject, *La Journal d'Accouchement* of Siebold, and the Thesis of Brossart. Blount also relates two cases of success. Latour, Lovenhart, and Martins have each recorded another. It is, indeed, a valuable resource, and always easy of application. Although it is true that we can thus suspend the flow of arterial blood, we may also prevent the return of the venous blood; and we should be as careful as possible not to compress at the same time the vena cava. Preserving our presence of mind during the flow of blood, we must bear in mind the necessity of bringing on uterine contraction, and soon, at the end of an hour or two, we may remove compression by degrees from the aorta.

d. *Secale cornutum*.—The ergot of rye, employed by MM. Balardini, Bigeschi, Bordot, Goupil, Villeneuve, &c., is said to put a stop to inertia, to compel the womb to contract, and thus to overcome the adhesions of the after-birth, expel the placenta, and thereby suspend the flooding. According to these practitioners, as the delivery of the placenta has been always found to be prompt, and never accompanied or followed by hemorrhage in women who have taken the oxytocic powder during labor, we ought to conclude that it must be of great service in cases of preternatural adhesions of the placenta, and flooding coming on after the birth of the child.

The observations published by Nugent, Lannyon, Boulton, Corbet, and other practitioners, leave scarcely any doubt on this subject. The success obtained by Spajrani, Cabini, Pignacca, Bazzoni, Duparque, Perronier, and myself, from ergot, whether in leucorrhœa, or in menorrhagia in general, or in almost all hemorrhages by exhalation from the mucous membranes, permits us to place in it some confidence.

It seems, in fine, that ergot was already employed as an oxytocic means from the time of Charlemagne. We see, indeed, in a legend of this period, that the dame Gulbeyaz, who was with a woman in labor, took a head of rye from a bouquet in the hands of her little daughter, and threw the powder of the chaff of the grain into some water, and told the servant to carry the potion to her mistress. One hour sufficed to demonstrate its virtue, and the accouchement took place without pain.

To the works published upon the virtues of ergot, we may also add a very interesting memoir by M. Parent de Beaune.

I would willingly exhibit the article in cases of adhesion, but, having had no opportunities of meeting with them, I am not in possession of any facts of my own in relation to it. As to hemorrhage, some physicians have thought that they have seen it produced by the obstetrical powder. A young woman was seized with a violent flooding after the birth of the child, although I had administered to her a dose consisting of forty-five grains of ergot, during the labor, and notwithstanding, it had produced all the effect I had anticipated. I have also observed a very similar case quite recently, and am led to believe that, although the ergot may be useful where the flooding is produced by inertia of the womb, it is not alone in grave cases that we may expect advantageous results, but also in cases of moderate hemorrhage, which may occur at any time after delivery. I will add, in fine, that we cannot always measure the danger of the discharges by their abundance. A woman died of it at the *Hôpital de l'École*, although she lost but two pounds of blood; and Knowles states the same thing of a woman who was convinced beforehand that she would not survive her accouchement, which was the tenth.

e. *Injections of the cord*.—Another resource, which was first put in practice by Dr. Mojon, then by MM. Hoffman, Taroni, Lemaistre, &c., consists in injecting a cold styptic fluid into the placenta, through the umbilical vein. M. Mojon insists that, previously to throwing in the injection, we should draw the blood

out of the vein and its branches by exhausting with a syringe; but MM. Hoffman and Taroni have succeeded without using this precaution. The first made use of the oxyerate; the second employed brandy and water; and the last-named practitioner was satisfied with injecting cold water alone. In all three of the cases, the womb, which had previously been soft and inert, contracted immediately; the placenta was expelled, and the hemorrhage was arrested; but nothing, not even the fact recently related by M. Sandras, proves that the placenta was still adherent, and that more skillful tractions exerted upon the cord might not have produced the same effect. A case related a few days ago in a public journal would even prove, were the journal and the author worthy of credence, that these injections may be wholly inefficacious.

This remedy might be tried in a case of supposed adhesion, with inertia and flooding, after having vainly employed the ordinary resources, and previously to introducing the hand into the uterus. Its action must be both mechanical and chemical; it unwrinkles and swells the placenta, distends the womb, and occasions a sudden reduction of temperature, a contraction of the vascular mouths, and a more or less powerful constriction, admitting, always, that the fluid injected reaches as far as the uterine surface of the placenta. It must in fact combine a part of the advantages attributed by certain authors to injections thrown directly into the womb, or through bladders, and to the tampon, so much lauded by Leroux, without having any of the inconveniences. It has now been put in practice too often in different countries, and by persons differently situated, for its efficacy to be doubted. Paulini de Perrugia, Lanci de Livourne, Avanzini de Votri, Galleti, Lasagna, Mondono, Genzana, Pescia, Baldissone, Calderoni, and Ferrario have especially extolled its use in their country (Italy). Jemina and Chiesa also praise it. Many practitioners have tried it with success in Germany; and Professor Hohl has published some observations on it. In France, it has been practiced with the same success by Dupasquier of Lyons, Fontaneilles, Duparcque, Legras, Pourret, De la Porte, Lemaistre, Sandras, J. Hatin, and Roux of Marseilles. MM. Stoltz and Id. Baud have also derived advantage from injections of the cord in cases of slow delivery of the after-birth. It seems, however, that there is some fear that it may bring on peritonitis, for Michelaccia so states, and was violently opposed by Pacini in a letter to Cortini. It appears to me that, when there is hemorrhage, the injection may be made with oxyerate or any other styptic solution, with cold water only when there is inertia, and with warm water when the uterus seems to be very much disposed to irritation.

The operation is, besides, very simple. After having disengaged the cord, the pipe of a syringe, containing six or eight ounces of very weak brandy and water, vinegar and water, or any suitable medicinal liquid, may be introduced into the vein. The injection may be pushed up with sufficient force to make it penetrate throughout the placenta, and to hinder it from escaping before it has produced its effect, a ligature must be thrown round the cord. The woman is soon seized with tenesmus and colic; the uterus and abdominal muscles contract; the os uteri yields, and the after-birth is promptly expelled.

M. Guillon recommends that, instead of all these means, we should inject some *bouillie*, a sort of liquid cataplasm, astringent, or emollient, into the interior of the womb itself, and I see not why we might not follow his example where the intervention of the hand is not allowable.

In fine, it is necessary to distinguish between the discharges which occur after the uterus is naturally contracted, and which are accompanied with a febrile movement and signs of irritation, and those which appear within the first twenty-four hours after labor, and which almost always coincide with a want of, or irregular action of the uterus.

We must also bear in mind the distinction between external and internal hemorrhage, and recollect that in the latter the blood may be retained in the

cavity of the womb by the placenta, or by the contraction of the os uteri itself, and that the same thing may occur in the vagina. It even appears, from the observation of Fournier, that a quantity of serum, if not liquor amnii, may be retained along with blood above the placenta, or between the membranes. We have seen, in the article on Pregnancy, that one variety of hemorrhage is due to a retention of blood in the vagina, as is demonstrated by the three observations of Heming, and two of Wetherell. In the case of this kind which Pomerat gives, the blood was retained by a flap of the membranes, and I have also seen three similar cases.

g. *Transfusion*.—The idea of re-introducing blood into the veins of a patient dying of hemorrhage has occurred to modern accoucheurs, as it did to physicians of the seventeenth century. It has been practiced, without any satisfactory results, by Dieffenbach in Germany, and by Roux in France, in cholera, and in some surgical cases. It seems to have been more successful in midwifery. Blundell, who has especially called attention to it, says that he has employed transfusion with success in women suffering from uterine hemorrhage. He gives, also, the experience of other practitioners, especially that of Doubleday, and described the apparatus used. Brigham, Hewell, Clement, Schneemann, Goudin, Savy, and Waller have also practiced it with advantage, and Ingleby says that he can now enumerate twenty successful cases. Banner gives one, and Klett two fortunate examples.

Transfusion, however, is a dangerous resource, the benefits of which are far from being constant. Boyle states that a woman who submitted to it at the Middlesex Hospital died very suddenly; and Burns remarks that phlebitis may be the consequence, although it may have at first succeeded. Besides, for what end is it employed? While the hemorrhage is taking place, it does not prevent the blood from flowing: it is, then, to remedy anemia, or the emptiness of the vessels, and the syncope or convulsions which too often follow severe hemorrhage, that it should be thought of. It remains, therefore, a question, as Burns remarks, whether warm water will not produce the same effect by filling the vessels better than the blood of another person.

§ 9. CONVULSIONS AND MULTIPLE PREGNANCY.

A. *Convulsions*, and repeated *fits of syncope*, which come on after the birth of the child, may, like flooding, be occasioned by various causes; but the presence of the after-birth being of itself sometimes sufficient to produce them, we should begin by delivering it in women so affected. For the remainder, we are to act as has been advised in speaking of convulsions in general. The same is true of the simple debility or exhaustion that sometimes supervenes upon a protracted labor, or succeeds to other accidents. Provided the after-birth seems to have any influence in occasioning this state, we should make haste to extract it. Nothing but the necessity of leaving the woman in a state of quiet, or the fear of bringing back a flooding, should induce us to temporize, in a case where no other accident is at the moment present.

B. In *multiple pregnancy* the delivery of the placenta ought not to be solicited until after the complete termination of the child-birth. As the appendages of the two children always adhere together, at least by some of their points, the one could not be extracted without detaching the other. Not that this practice must inevitably occasion an inertia of the womb, or bring on flooding, as has been supposed by some persons, who found the opinion upon the false notion that certain large orifices would remain, through which the blood flows into the uterine cavity, but because it is always dangerous to destroy the organic relation of the foetus with its mother, unless it be on the point of expulsion itself. One single circumstance might permit us to depart from this rule: it is when the after-birth of the first child presents spontaneously at the orifice, before the birth

of the second, and then care should be taken not to destroy the adhesions of the one that remains.

In general, the delivery of the placenta after the birth of twins is longer in taking place than is ordinarily the case, provided it be not provoked by the accoucheur; which depends upon the uterus having rather less tendency to contract, and perhaps also upon the fact that the size of a double placenta is necessarily greater than of a single one.

In order to assist it, we may take hold of one of the cords, or one of the placentæ, and draw down the two after-births, one after the other. Mauriceau says we must draw sometimes on one, sometimes on the other, and bring the whole down together; but it is better, more prompt, and safer to twist the two cords round each other, so as to make one string of them, and then act as in a simple case. The placentæ being almost never at the same level in the organs, present at the orifice in succession, and not both at once; besides, if the contrary should happen to be the case, and their escape rendered difficult, it would be too easy to overcome such an inconvenience for it to be necessary for me to enter into any long explanations concerning it.* As the two cords may communicate by the large vessels on the surface of the placenta, it is necessary to see that no hemorrhage takes place from the first cord so soon as the child is separated. If there is any danger of this, we should not hesitate to place a ligature on the placental end of the divided cord; but we would be wrong in admitting, with Saxtorph, that this ligature is always necessary. The advice given by Millot to apply a thick, square compress over the free portion of the hypogastrium, and to maintain it with a tight bandage until the escape of the second child, is not to be despised, especially when there is the least danger of hemorrhage or inertia.

§ 10. IN ABORTION.

After an abortion, the delivery of the placenta is generally not so easy as it is after a labor at full term; in the first three months of pregnancy, the ovum is almost always expelled whole, and there is therefore no *deliverance*, properly so called; but after that period, this expulsion in mass becomes more and more rare and difficult. The foetus escapes first; its involucre remain and are not expelled until some time afterwards, sooner or later. The cervix recovering its original form and length, soon resists the necessarily feeble efforts of the uterus; the after-birth having scarcely changed its relations to the organs in which it is contained, cannot clear its orifice and fall into the vagina, but with great difficulty. On the other hand, the cord is so weak that it will bear only slight pulling, and retention of the placenta after abortion is scarcely a less serious matter than after labor at full term.

As inertia, and inversion of the womb are not to be dreaded in this case, the wisest course in my opinion is to make haste to effect delivery before the cervix has had time to close, either by pulling moderately at the cord, or by getting hold of the placenta with the fingers if possible. But when we have waited too long, or have been called too late, we are compelled to wait still longer and confine ourselves to endeavors to promote the contraction of the uterus. Should any accidents supervene, the hand could not be carried up as far as the placenta, on account of the resistance of the cervix, and the smallest extractive force would soon rupture the cord. I presume this would be the proper case to try the injections recommended by Dr. Mojon, provided the cord has not been broken. In such a case, I am very partial to the ergot. If, however, the pla-

* Let not the student be led, from the above paragraph, to expect to find two distinct placentæ in all cases; on the contrary, most of the cases of twins are accompanied with a single oblong or oval placenta, the two cords springing from the eccentric points. In a case of triplets, under my care, there was one very long oval placenta, with the three umbilical cords in a line, distant near two inches from each other.—M.

centa should appear at the orifice, or could be felt with the finger, and the tractions of the hand should prove insufficient to extract it, an attempt might still be made to bring it down with the *pince à faux germes*. Otherwise, its expulsion is to be left to the natural powers, and we must take care to prevent the occurrence of accidents, or, if they do occur, to combat them as soon as they make their appearance. We may resort to blood-letting, opiates, and baths general and local; emollient or detergent injections may be thrown into the vagina, and even into the womb, so as to neutralize the effects of putrefaction; the woman is to be confined to a strict diet, and as soon as the os uteri becomes somewhat open, such portions of the after-birth as may present themselves are to be removed. The spatula, invented by Millot, to separate the placenta in cases of abortion, is an instrument which no practitioner should undertake to employ. I doubt also whether Dugès seriously reflected, when he proposed with the same view, and also to bring away the remains of the placenta at any time, his *anse de fil d'archal*, curved in the form of a hook, or as a rake. Acting thus in the dark, if the hand cannot accompany it, such means would be useless or dangerous, and when the fingers can penetrate into the uterus, every kind of instrument would be superfluous.

Sometimes all these precautions are of no avail, provided the os uteri has closed soon after the escape of the fœtus, and the placenta may remain in the uterus for a longer or shorter period without putrefying. Cases have been seen where the women in some sort forgot it, did not discharge it until after the lapse of one or two years, when they even became impregnated again, proceeded to their full term, and then discharged it together with the new placenta. It is then also that resorption of the placenta, whether real or apparent, has been most frequently observed; it is then, at least, and only then, that I believe that it has ever been met with. Three of the cases reported by Nægele occurred after abortion; and Ingleby, who has seen portions of the placenta at term thus disappear, gives strong proof of this resorption after premature delivery. But the placenta and membranes are most commonly expelled either piecemeal or in one mass, in the course of the first week after the miscarriage, or they are gradually discharged along with the lochia, or by means of injections. It will be understood, further, that these difficulties become more frequent and numerous in proportion as the abortion takes place nearer to the middle period of gestation; that they are, on the contrary, less severe, and more easy to overcome, the nearer they occur to the natural period of parturition.

§ 11. FEIGNED DELIVERY OF THE PLACENTA.

Few persons would believe that the delivery of the placenta could be feigned by a woman who was not pregnant; nothing, however, is more true. Pellassy, who selected this subject for a thesis, proves, by twelve attempts on the dead subject and six on the living woman, that the placenta and the membranes can be introduced into the vagina. A girl, whom I saw at the hospital at Tours, and more recently at the Hospital St. Louis of Paris, did this, by stuffing her vagina full of bits of rag, to feign a complete delivery, after having said that she had been pregnant during nearly three years.

TABLE I.

DIVISION OF LABOR.

	<ol style="list-style-type: none"> 1. Natural. 2. Unnatural. 3. Mal-presentations. 	<ol style="list-style-type: none"> 1. Laborious. 2. Difficult. 3. Unnatural. 1. Anterior surface. 2. Posterior surface. 3. Presentation of the side. 4. Presentation of the feet.
MAURICEAU.		
	<ol style="list-style-type: none"> 1. Natural labors. Requiring no assistance. 2. Preternatural labors. Requiring the use of the hand. 3. Laborious labors. Requiring the use of instruments. 	<ol style="list-style-type: none"> 1. Positions of the vertex. 2. Positions of the feet. 3. Positions of the knees. 4. Positions of the breech. 1. Faulty positions. 2. Accidents during labor. 1. Faults of the female organs. 2. Monstrosity of the fetus. 3. Want of power of the organs.
BAUDELOCQUE.		
5 Classes.		
	<ol style="list-style-type: none"> 1. Natural, or without assistance. 2. Unnatural, requiring the use of the hand, the forceps, or the fillet, &c. 3. Unnatural, in which it becomes necessary to divide the tissues of the mother or child. 	
FLAMANT.		
3 Classes.		
	<ol style="list-style-type: none"> 1. Eutocia. 2. Dystocia. 	<ol style="list-style-type: none"> 1. The vertex. 2. The face. 3. The pelvis. 1. Hemorrhagic. 2. Convulsive. 3. Aneurismal. 4. Hernial. 5. With procidentia. 6. From disease of the woman. 7. From narrowness of the pelvis. 8. From mal-presentations. 9. From exhaustion, &c.
MM. DUBOIS and DESORMEAUX.		
Mead. BOIVIN and LACHAPELLE.	<ol style="list-style-type: none"> 1. Like those of BAUDELOCQUE. 2. Presentations of the face are classed among the natural labors. 	
The AUTHOR.		
2 Classes.		
		<ol style="list-style-type: none"> 1. All labors that terminate spontaneously. 2. All labors requiring assistance.

TABLE II.

POSITIONS OF THE FŒTUS ACCORDING TO DIFFERENT AUTHORS.

1. BAUDELOQUE.	Vertex. . .	{	1. Occiput behind the left acetabulum.			
			2. Occiput behind the right acetabulum.			
			3. Occiput behind the symphysis pubis.			
			4. Occiput in front of the right sacro-iliac symphysis.			
			5. Occiput in front of the left sacro-iliac symphysis.			
			6. Occiput in front of the sacrum.			
	Face. . .	{	1. Forehead upon the symphysis pubis.			
			2. Forehead upon the sacro-vertebral angle.			
			3. Forehead upon the left ileo-pectineal eminence.			
			4. Forehead upon the right ileo-pectineal eminence.			
	Feet. . .	{	1. Heels behind the left acetabulum.			
			2. Heels behind the right acetabulum.			
			3. Heels behind the symphysis pubis.			
			4. Heels in front of the sacrum.			
	Knees. .	{	1. Front of the legs behind the left acetabulum.			
			2. Front of the legs behind the right acetabulum.			
			3. Front of the legs behind the symphysis pubis.			
			4. Front of the legs in front of the sacrum.			
	Breech. .	{	1. Sacrum behind the left acetabulum.			
2. Sacrum behind the right acetabulum.						
3. Sacrum behind the symphysis pubis.						
4. Sacrum in front of the promontory.						
Trunk. .	{	Posterior surface.	{			
		1. Occiput.				
		2. Neck.				
		3. Breast.				
		4. Loins.				
	{	Anterior surface.				
		1. Face.				
		2. Neck.				
		3. Sternum.				
		4. Abdomen.				
	{	Lateral surface.				
1. Neck.						
2. Shoulder.						
3. Thorax.						
4. Flank.						
5. Hip.						
2. GARDIEN.	Vertex. .		Same as BAUDELOQUE.			
	Face. . .	{	1. Forehead left.			
			2. Forehead right.			
			3. Forehead front.			
			4. Forehead back.			
	Feet. . .		1. Heels, legs, or sacrum left.			
	Knees. .		2. Heels, legs, or sacrum right.			
	Breech. .		3. Heels, legs, or sacrum front.			
			4. Heels, legs, or sacrum back.			
	Trunk. .	{	Lateral surface.			{
			Posterior surface.			
			Anterior surface.			
3. MAYENIER.	Vertex. .	{	1. Left occipito-cotyloid.			
			2. Right occipito-cotyloid.			
			3. Right occipito-sacro-iliac.			
			4. Left occipito-sacro-iliac.			
	Face. . .		Same as GARDIEN.			
	Feet. . .	{	1. Left calcaneo-cotyloid.			
			2. Right calcaneo-cotyloid.			
			3. Right calcaneo-sacro-iliac.			
			4. Left calcaneo-sacro-iliac.			
	Knees. .		Same relations.			
	Breech. .		Same relations.			
	Trunk. .	{	Anterior surface.			{
1. Belly.						
2. Breast.						
Back.—No subdivisions.						
1. Hip.						
Lateral surface.						
2. Shoulder.						
3. Ear.						
				1. } Same as GARDIEN.		
				2. }		
				3. }		
				4. }		

TABLE II.—CONTINUED.

4. CAPURON.	Vertex.	1. Left occipito-anterior.			
		2. Right occipito-anterior.			
		3. Right occipito-posterior.			
		4. Left occipito-posterior.			
	Feet.	1. Left calcaneo, tibio, or sacro-anterior.			
		2. Right calcaneo, tibio, or sacro-anterior.			
		Knees.	3. Right calcaneo, tibio, or sacro-posterior.		
			Breech.	4. Left calcaneo, tibio, or sacro-posterior.	
	Face.	1. Chin behind and right.			
		2. Chin behind and left.			
3. Chin in front and left.					
4. Chin in front and right.					
Trunk.	Posterior surface.	1. Occiput.	1. Head front and left.		
	Anterior surface.	2. Back.		2. Head front and right.	
		1. Face.		3. Head back and right.	
	2. Breast.	4. Head back and left.			
	Right lat. surface.	Side of the head.			
	Left lat. surface.	Shoulder.			
5. BOIVIN.	Vertex.	Like GARDINER.			
	Face.	1. Left mento-iliac.			
		2. Right mento-iliac.			
		3. Mento-pubic.			
		4. Mento-sacral.			
	Feet.	Like BAUDELOQUE.			
	Knees.				
	Breech.				
	Trunk.	Anterior surface.—	Like BAUDELOQUE; but no subdivision.		
		Posterior surface.	1. Cervico-sacral.	1. 1. Head to the left.	
2. Cervico-pubic.			2. 2. Head to the right.		
3. Right cervico-iliac.			3. 3. Head in front.		
4. Left cervico-iliac.	4. 4. Head behind.				
Lateral surface.	1. Costal region.	1. 1.			
	2. Region of the shoulder.		2. 2.		
	3. Region of the ear.		3. 3.		
			4. 4.		
6. LACHAPELLE.	Vertex.	1. 1st of BAUDELOQUE.			
		2. <i>Idem</i> .			
		3. 4th of BAUDELOQUE.			
		4. 5th of BAUDELOQUE.			
		5. Occiput to the left.			
		6. Occiput to the right.			
	Face.	Like BAUDELOQUE.	Moreover there are intermediate, imperfect, and inclined positions.		
	Feet.				
	Knees.				
	Breech.				
Shoulder.		No other positions of the trunk.			
7. FLAMANT.	Vertex.	1. Occipital fontanelle above the left acetabulum.			
		2. Occipital fontanelle above the right acetabulum.			
		3. Occipital fontanelle above symphysis pubis.			
		4. Occipital fontanelle above right sacro-iliac symphysis.			
		5. Occipital fontanelle above left sacro-iliac symphysis.			
		6. Occipital fontanelle above sacro-vertebral angle.			
		7. Occipital fontanelle above left iliac fossa.			
		8. Occipital fontanelle above right iliac fossa.			
	Breech.	Eight species, like those for the vertex.			
	Trunk.	Anterior surface.	1. Face.	1. Head to the left.	
2. Throat.			2. Head to the right.		
3. Sternum.					3. Head in front.
4. Abdomen.					
Posterior surface.	1. Nucha.	1. Head to the left.			
	2. Back.		2. Head to the right.		
	3. Loins.			3. Head in front.	
	4. Sacrum.				4. Head behind.
Lateral surfaces.	1. Cheek.	1. Head to the left.			
	2. Neck.		2. Head to the right.		
	3. Shoulder.			3. Head in front.	
	4. Hip.				4. Head behind.

TABLE II.—CONTINUED.

8. DUGES.	Vertex.	4 positions, like MM. MAYERIER and CAPURON.	$\left\{ \begin{array}{l} 1. \text{ Loins to the left.} \\ 2. \text{ Loins to the right.} \\ 3. \text{ Loins in front.} \\ 4. \text{ Loins towards the back.} \\ 1. \text{ Vertex to the left.} \\ 2. \text{ Vertex to the right.} \\ 1. \text{ Back in front.} \\ 2. \text{ Back to the rear.} \\ 1. \text{ Back in front.} \\ 2. \text{ Back to the rear.} \end{array} \right.$	Making in all 14 species.		
	Pelvis.	4 positions.				
	Face.	2 positions.				
	Right shoulder.	2 positions.				
	Left shoulder.	2 positions.				
DUBOIS, DESORMEAUX, DEWEES.	Vertex.	} Like BAUDELOCQUE.	} Like BAUDELOCQUE, except the subdivisions.			
	Face.					
	Feet.					
	Knees.					
	Breech.					
10. NÉBEL.	Trunk.					
	Head.	Cranium.—2 varieties.	$\left\{ \begin{array}{l} 1. \text{ Occiput to left acetabulum.} \\ 2. \text{ Forehead to the left acetabulum.} \\ 1. \text{ Chin to right ilium.} \\ 2. \text{ Chin to left ilium.} \\ 1. \text{ Sacrum to the left ilium.} \\ 2. \text{ Sacrum to the right ilium.} \\ 1. \text{ The head to the left.} \\ 2. \text{ The head to the right.} \end{array} \right.$			
	2 varieties.	Face.—2 varieties.				
	Pelvis.—2 varieties.					
	Shoulder.—2 varieties.					
THE AUTHOR.	Head. 2 species.	Vertex. 2 species.	$\left\{ \begin{array}{l} 1. \text{ Occipito-ant., 3 var.} \\ 2. \text{ Occipito-post., 3 var.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. \text{ Left occipito-acet.} \\ 2. \text{ Right occipito-acet.} \\ 3. \text{ Occipito-pubic.} \\ 1. \text{ Left fronto-acet.} \\ 2. \text{ Right fronto-acet.} \\ 3. \text{ Fronto-pubic.} \\ 1. \text{ Right mento-ilic.} \\ 2. \text{ Left mento-ilic.} \\ 3. \text{ Mento-pubic.} \\ 4. \text{ Mento-sacral.} \end{array} \right.$		
		Face. Only one species at the inferior strait.				
		} Mento-pubic, 4 varieties at the superior strait.				
	Lower end of the trunk, only one kind: the Pelvis.	} 3 shades	$\left\{ \begin{array}{l} 1. \text{ Feet.} \\ 2. \text{ Knees.} \\ 3. \text{ Breech.} \end{array} \right.$	} 2 species.	$\left\{ \begin{array}{l} 1. \text{ Sacro-an-} \\ \text{terior,} \\ 3 \text{ varieties.} \\ 2. \text{ Sacro-} \\ \text{posterior,} \\ 3 \text{ varieties.} \end{array} \right.$	
	Trunk. 3 genera.	} 1. Lateral surface. One species. The shoulder. 2 varieties. 2. Posterior surface. One species. The back. 2 varieties. 3. Anterior surface. One species. The breast. 2 varieties.	$\left\{ \begin{array}{l} 1. \text{ Head left.} \\ 2. \text{ Head right.} \\ 1. \text{ Head left.} \\ 2. \text{ Head right.} \\ 1. \text{ Head left.} \\ 2. \text{ Head right.} \end{array} \right.$	$\left\{ \begin{array}{l} 1. \text{ Left.} \\ 2. \text{ Right.} \\ 3. \text{ Pubic.} \\ 1. \text{ Right.} \\ 2. \text{ Left.} \\ 3. \text{ Sacral.} \end{array} \right.$		

Besides these, there are inclined positions of the head: 1. The temple; 2. The forehead; 3. The occiput. And of the breech there are: 1. The hip; 2. Sacrum; 3. The parts of generation.

TABLE III.

ANORMAL PRESENTATIONS OF THE FÆTUS.—TOKOLOGICAL OPERATIONS.

AUTHORS.	Number of labors.	Breech.	Feet.	Face.	Knees.	Trunk.	Forceps.	Turn- ing.	Cepha- lotomy.
Boer	6,555	126	68	58	—	—	38	39	10
Bland	1,897	36	18	5	—	—	9	9	10
Merriman	1,800	42	23	4	—	—	12	29	7
Madame Boivin	20,517	363	234	74	4	96	96	218	16
Madame Lachapelle	22,243	492	203	103	9	118	76	174	12
M. Nægèle	415	15	—	4	—	2	15	3	1
M. Nægèle	1,296	61	—	—	—	18	41	19	4
Total	54,723	1135	546	248	13	234	287	491	60

TABLE IV.

LABORS OBSERVED BY MM. BLAND, MERRIMAN, DEWEES, ARNELL, MOORE, NÆGELE, BOER, MESDAMES BOIVIN AND LACHAPELLE, AND AT THE DUBLIN LYING-IN HOSPITAL.

	Number of children	Twins.	Triplets.	Four at a birth.	Boys.	Girls.	Dead.
Messrs. Dewees, Arnell, and Moore	About 35,000	About 200	Only 1	—	Uncer.	Uncer.	Uncer.
Madame Boivin	20,517	153	3	—	Uncer.	Uncer.	Uncer.
Merriman	1,813	22	1	—	929	884	Uncer.
Dublin Hospital	106,766	2,110	26	1	55,854	50,962	9,497
Madame Lachapelle	37,895	444	5	—	19,474	18,421	2,291
Nægèle	415	6	1	—	199	216	31
Boer	15,608	Uncer.	—	—	Uncer.	Uncer.	Uncer.
	or in 6,555 cases	92	—	—	Uncer.	Uncer.	463
Total	224,569	3,027	37	1	76,406	70,483	12,282

Thus, there were 3027 twins, 37 triplets, and only one case where 4 children were produced at a birth, in about 200,000 births. 146,889 yielded 76,406 boys and 70,483 girls; and out of a total of 160,269 children, 12,282 were born dead. M. Schweighäuser reports a second case of 4 at a birth; the public papers have mentioned a third instance, in France, of late years; Merriman speaks of a fourth, which occurred in Worcestershire in 1829; and Osiander says, according to a letter, that a woman was delivered of 5 living children, near Oporto, in 1788.

TABLE V.

TABLE SHOWING THE MORTALITY OF LYING-IN WOMEN IN DIFFERENT COUNTRIES AND AT DIFFERENT PERIODS; FROM THE REGISTERS OF THE DUBLIN LYING-IN HOSPITAL, MM. DE CHATEAU-NEUF, DUGES, &c.

	Years.	Labors.	Deaths.	Years.	Labors.	Deaths.
Dublin Lying-in Hospital.	1757	55	1	1791	1603	25
	1758	454	8	1792	1631	10
	1759	406	5	1793	1747	19
	1760	556	4	1794	1543	20
	1761	521	9	1795	1503	7
	1762	533	6	1796	1621	10
	1763	488	9	1797	1712	13
	1764	588	12	1798	1604	8
	1765	533	6	1799	1537	10
	1766	581	3	1800	1837	18
	1767	664	11	1801	1725	30
	1768	655	16	1802	1985	26
	1769	642	8	1803	2028	44
	1770	970	8	1804	1915	16
	1771	695	5	1805	2220	12
	1772	704	4	1806	2406	23
	1773	694	13	1807	2511	12
	1774	681	21	1808	2665	13
	1775	728	5	1809	2889	21
	1776	802	7	1810	2854	27
	1777	835	7	1811	2561	24
	1778	927	10	1812	2676	43
	1779	1011	8	1813	2484	62
	1780	910	5	1814	2508	25
	1781	1027	6	1815	3075	17
	1782	990	6	1816	3314	18
	1783	1167	15	1817	3473	32
	1784	1261	11	1818	3539	56
	1785	1292	8	1819	3197	54
	1786	1351	8	1820	2458	50
	1787	1347	10	1821	2849	23
	1788	1469	23	1822	2675	12
	1789	1435	25	1823	2584	59
	1790	1546	12			
	1799	1364	100	1809	1795	66
	1800	1155	120	1810	1814	71
	1801	1209	55	1811	2395	108
	1802	1496	43	1814	2384	127
	1803	1632	108	1815	2346	149
	1804	1662	39	1816	2422	46
	1805	1564	60	1817	2800	63
	1806	1625	114	1818	2411	152
	1807	1691	72	1819	1528	187
	1808	1690	57			
	1816	9683	81	1819	11580	100
	1817	10528	90	1820	11634	228
	1818	11662	167	1821	11481	223
M. DUGES, at the Maternité of Paris.						
M. DE CHATEAU-NEUF, at Paris.						
At { Wassenda, in Sweden, 1 death in 62				At { Hotel-Dieu, Paris, 1 in 15		
	Berlin 109 in 10,000				London, in 30 years, 820 in 10,000	
	British Hospital 1 in 50				Strasburg 1 in 100	
	Manchester 1 in 128				Petersburgh 7 in 1000	

EXTRACTS FROM VARIOUS REPORTS.

- M. Ramoux. (*Bulletin de la Faculté, t. ii. p. 78.*) Cl. of Cokmar (from the 7th December, 1806, to the 31st of December, 1808).—Two hundred and seventy-five labors. Head, two hundred and sixty-six. Feet, two. Breech, three. Right shoulder, two. Face, two.
- Clin. of Liège (1808), two hundred and sixteen.—Abdomen, one. Right hip, two. Face, one. Right arm, two. Feet, one. Breech, one. Version, one. Forceps, two. Hem. from placenta prævia, one. Three women died; Cæsar. operat., one. One, symphysectomy. One, malignant fever.
- Assalini. Sainte-Catherine of Milan.—Out of two hundred and sixty-nine, ten deaths. Children, forty-one. Cæsarian operation, three. One living child. Women, none. (*Nuov. Instr. di Ostetr.*)
- G. M. Richter. (*Synops. praxis medica obstetr., Mosquæ, 1810.*)—From January 1st, 1801, to the 1st of January, 1807, two thousand five hundred and seventy-one labors. Eighteen women died. Twins, fifty-two. Triplets, four. Feet, twenty-eight. Knees, two. Breech, forty-eight. Version, twenty-five. Forceps, fifteen. Cephalotomy, three.
- Ibid.* (Pag. 416).—Private practice, six hundred and twenty-four. Forceps, thirty-four. Version, twenty-seven. By the arm, twelve. From convulsions, six. From the placenta over the orifice, five. From escape of the cord, four. Cord around the neck, twenty-seven.
- Wellesley Instit. (*Dublin Reports, vol. v. p. 495.*)—To the 31st December, 1828, three hundred and ninety-eight labors. Forceps, one. Cephalotomy, two. Arm, four. Breast and pelvis, eight. Falling of the cord, five. Eclampsia, six. Implantation of the placenta, six. Hemorrhage arrested by rupture of the membranes—artificial delivery for hemorrhage, fifteen. (Mr. Hart.)
- Ibid.* (For 1829), three hundred and thirteen.—Breast and pelvis, six. Arm, one. Version, five. Forceps, three. Cephalotomy, three. *Ergot*—doubtful effects. Artificial delivery, seven. Spontaneous evolution, one at the seventh month; child dead. (Mr. Cusack.)
- Combe Hospital. Since Feb. 1829, from the time of its opening, eight hundred and eighty-seven.—Six hundred and ninety-one labors. Face, two. Breast, fourteen. Feet, seven. Arm, three. Shoulder, one. Cord, seven. Version, twelve. Still-born, fifty-five.
- Ibid.* (P. 577).—Arm, three. Pelvis, three. Breast, four. Cord, four. Crotchet, three. Version, four. Premature, twenty-nine. Abortion, two. Spontaneous evolution, one. (Mr. Gregory.)
- M. Riecke. (*Beiträge, etc. Arch. t. xx. p. 76.*)—First of July, 1821, to the 1st of July, 1825, in Wurtemberg, two hundred and nineteen thousand three hundred and fifty-three labors.—Two hundred and twenty-one thousand nine hundred and eighty-three children. Twelve hundred and forty-eight women died. One in seventy-five. Still-born, or shortly after birth, six thousand six hundred and thirty. One in twenty.
- Proportion of labors.—January, March, October, November, December, September, May, February, April, August, July, and June.
- Two thousand five hundred and eighty-three compound labors, of which two thousand five hundred and forty-five were twins, thirty-four triplets, and two quadruplets.
- Natural labors, two hundred and fourteen thousand and thirty-four. Spontaneous, hands with the head—cord at the side of the head—spontaneous version from powerful contraction, ten. The most frequent by the pelvis.

The arm ascended twice. In one, the head gave place to the shoulder. Version became necessary.

With assistance, seven thousand nine hundred and forty-nine. In a thousand, there were 10½ embryotomies. Forceps, three hundred and forty-four and a half. Version by the feet, three hundred and ninety-four and three-eighths. Extraction by the breech or the feet, sixty-three and a half. Detachment of the placenta, one hundred and eighty-eight. Version by the head, two. Making sixteen in all.

Fourteen embryotomies. Eighty-four cephalotomies. Eighteen *paracenteses*.

P. Dubois. (*Lancette Française*, t. vii. pp. 288, 314, 301, or numbers 104, 105.)

—1st of June, 1829, to the 1st of June, 1833, ten thousand seven hundred and forty-two labors. Ten thousand two hundred and sixty-two by the head. Three hundred and ninety-one by the pelvis. Fifty-nine by the body, and thirty by the face.

In ten thousand two hundred and sixty-two, nine thousand eight hundred and sixty-seven were at term, of which thirty were dead before birth; a hundred and ninety-one died afterwards, that is to say, one in fifty-one or fifty-two.

In three hundred and ninety-five before term, thirty-four were not seven months. Eighty-three were putrid. Two hundred and seventy-eight born alive, of which forty-eight died; one in five or six.

In three hundred and ninety-one by the pelvis, two hundred and thirty-eight were at term; seven died before. Two hundred and thirty-one alive. Twenty-one died afterwards; one in eleven.

In a hundred and fifty-three before term, sixty-two died before. Thirty not viable. Sixty viable.

Merrem of Cologne. (B. de F. 17, 283) (1826).—One hundred and fifty-seven women. One hundred and fifty-nine children. Seventy boys. Eighty-one girls. Two abortions. Four premature labors. One hundred and fifty-three at term. First of the vertex, one hundred and fourteen. (Eight extract.) Thirty-two in the second. (Three extract.) One in the third. Two in the fourth. (One extract.) Face, one. Hips, six. (Three extract.) Version, three. Cæsarian operation, two. Still-born, ten. Smallest child, three pounds. Largest, eleven pounds—from sixteen to twenty-five inches. Artificial delivery of the placenta, one. Forceps, fourteen; with safety to the mother and child. One case of locked head, ear torn off; union took place. One of the Cæsarian operations succeeded.

Kluge. (Id. 402.) Charité of Berlin.—Two hundred and sixty-eight labors: One hundred and twenty-four boys; one hundred and forty-five girls. Two hundred and fifty-seven times, the head. Two hundred and fourteen, first. Thirty-five, second. Third, once. Twice, fourth. Vertex, once, second. Twice, third. Once, fourth. Face, once, fourth. Hips, five times, first. Once, third. Feet, four. Transv., two. Cord, around the neck, sixty-three. Forceps, fifteen. Version, three. Cæsarian operation, one. Forced labors, three. Cephalotomy, two. Incision of the perineum, two.

Kilian. (B. de F. 25, 352.)—Cl. of Prague (from 1789 to 1811), five thousand nine hundred and eighty-nine labors. Three thousand one hundred and sixteen boys. Two thousand eight hundred and seventy-three girls. From 1811 to 1825, one thousand and fifty-three labors. From 1825 to 1827, two thousand three hundred and fifty. One hundred and twenty forceps. Sixty-three versions. Four cephalotomies. One hundred and twenty-two times, the face. One hundred and twenty-five, the hips. Eight, the feet. Fifty-one transverse positions.

Mazzoni. (*Statistica Ostetrica di Santa Maria Nuova*, from the 11th of August, 1829, to the 31st of December, 1832.)—Four hundred and fifty-two labors.

Nine twins. Four hundred and forty-four living children. Head, four hundred and thirty-nine. Pelvis, five times. Cord, eighteen to twenty times.

Clinic of Strasburg. (1824 to 1829.)—One hundred and thirty-two labors. Seventy-four boys. Fifty-eight girls. One hundred and twenty-five by the head. Six by the pelvis. One by the shoulder. Thirteen still-born, of which seven were before term; and three abortions. Four women died. *Four face presentations.* Seventy-three, first. *Right parietal protuberance.* Thirty-one, fourth. *Left parietal protuberance.* All the posterior positions converted into anterior: Forceps, three. Lever, four. Cæsarian operation, one. Shoulder. *Spontaneous version.* Child died.

Hôtel-Dieu, Paris. (1829.)—Two hundred and eighty-four labors. Four double. Three pelvis. Two versions. One forceps. Nine women died, or one in thirty-one.

Hôpital Saint-Louis. (1828.)—Two hundred and forty labors. Parietal, two hundred and twenty-nine. Long and painful, six. Abortion, three. Forceps, one. Version, one. (M. Papavoine, *Journal des Progrès*, tom. xiv.)

Ibid. (1829.)—Three hundred and thirteen. In a statistic of eleven years, one woman died in twenty-three. (Heulhard, Darcy, thesis, 1830.)

Pigeotte de Troyes. (Clinique, t. iii. p. 397.) 1815 to 1828.—Thirteen hundred and sixty-two labors. Two forceps. No women died.

Carus. (Lanc. F. 1829.—1—448.)—At Dresden, 1827, two hundred and twenty labors. Thirty-three with assistance. Cephalotomy, one. Cæsarian operation, one. Artificial, two. Mature labor, one. Version, four. Forceps, nineteen. Detached placenta, six.

Ciniselli. (Gazette Médicale de Paris, 1838.)—Clinic of Pavia, 1830, 1831. Ninety-four women. Version, two. Forceps, one. Artificial labors, two. Auscultation succeeded. Unusual double beat; deaths from the cord around the foetus, six. Artificial labor at the Institute, eight times (Lovati).

Siebold. (B. de F. 21, 401.) Clinic of Berlin, 1827.—One hundred and thirty-seven labors. Forceps, fifteen. Version, twice. One hundred and one times the first presentation. Twenty-nine times the second. Twice the vertex. Twice the hips. Once the shoulder. Arm and legs, once with the cord. Once the hip. All the foetuses with the forceps, living. Seventy-five boys. Sixty-two girls. Cord around the neck, twenty-one times.

Waller. (Gazette, 1823, 654.) First six months of 1831.—Two hundred and ninety-one women. Four, feet. Three, the hips. Three twins. Eleven deaths.

BOOK VI.

THE SEQUENTS OF LABOR.

THE escape, or extraction of the placenta completes the labor, but there are certain attentions which still belong to the child and mother to be studied as *Les suites de couches*, or what the German accoucheurs, M. Nægèle among the rest, designate under the title of *puerperium* or *puerperalitté*. This part of the sciences comprises two very distinct questions; the one concerns the child, and the other relates to the mother.

PART I.

MANAGEMENT OF THE CHILD.

The management of the child varies according to the state in which it happens to be at birth, and according as it is healthy or diseased.

CHAPTER I.

OF THE CHILD IN A HEALTHY STATE.

WHEN the child is born alive and in good health, which is known by its cries and movements, after placing it properly between the mother's limbs, the cord is the only thing that requires the accoucheur's attention at first.

As soon as the child passes from the vulva, it should be laid crosswise upon its side, with the face turned towards the foot of the bed, between the woman's thighs. In this situation it can breathe, and runs no risk of being suffocated by the matters flowing from the vagina. Should the cord be found coiled round the body, it must be disengaged; it should be freed from any portions of the membranes that it may have brought along with it, and also from the mucus which sometimes obstructs the mouth or throat; and, lastly, we proceed to tie and cut the umbilical cord.

SECT. I.—ON TYING AND CUTTING THE CORD.

In the time of Hippocrates, the cord was not cut until the placenta was delivered. If the placenta was slow in coming away, the child was placed upon a pile of wool, or on a goatskin with small holes in it, so that, by the gradual subsidence of the skin or pile of wool, the weight of the child might react by almost insensible degrees upon the placenta, and extract it without any kind of violence. Aristotle says that, if the placenta does not come away at once, the cord should be tied and cut so that the child may be removed. Fournier is of

the same opinion. Deventer thinks the placenta should be extracted previously to dividing the cord; Dionis followed sometimes one plan, sometimes another. Where the secundines required only gentle pulling to extract them, he did not cut the cord until after they came away, and pursued an opposite practice when he found it necessary to introduce the hand in search of the after-birth. Since the time of Levret, it has been established as a general rule, among accoucheurs, to separate the child from the mother as soon as it has passed through the vulva, and that it is never necessary to wait for the expulsion of the foetal appendages. Le Bas says that Consell, in order to prevent hemorrhage, likewise recommends the placenta to be attended to before cutting the cord. Guillemeau must have followed the same course, since he recommends taking the child to the fire and applying the placenta over the belly for the purpose of reviving it. At first view the conduct of the ancients appears to be more rational and more physiological than that of the moderns; it seems that the placenta ought immediately to follow the fœtus, or at least be separated from the uterus before the cord can be prudently cut; that, before it is divided, the circulation ought to be permitted gradually to take on its new type, which soon becomes similar to that of the adult; but in reality it is not perceived that the present mode of practice produces the least inconvenience to the fœtus, and is certainly better for the mother. It would be in vain to object that this conduct is not natural, for it is followed by most of the animals themselves, who tear off the umbilical cords of their young as they escape from the vulva. Not only should we not wait until the placenta is delivered, but it is of no use to wait until the pulsations have ceased, before we cut the cord, as recommended by Denman and A. Leroy. Neither is there a general agreement as to whether the cord should be cut or tied first.

If we begin by applying the ligature, we have to do it under the bedclothes and on the lying-in bed. It is not then so easy to examine the umbilicus, and we deprive ourselves of the advantage of disengorging the viscera of the blood with which they are sometimes overloaded. In fine, as soon as respiration is established, the placental circulation becomes completely useless. If we cut the cord before we tie it, we are at liberty to carry the fœtus to any convenient place, attend to it if it be not well, and examine it with all desirable attention. However, it must be confessed that, if the child present nothing peculiar as to its condition, one of these modes of proceeding is scarcely preferable to the other, and that each practitioner is at liberty to adopt the one that pleases him best, without its having any influence upon the result of his practice.

ART. I.—CUTTING THE CORD.

The place where the cord is to be divided is altogether a matter of choice. According to Guillemeau and Fournier, "we must, to please the old women, give a good length to the boys, and cut it short for the girls." Deleurye advises seven or eight inches to be left, in order to be able to re-apply the ligature, if necessary. If it be cut at the distance of four or five inches from the navel instead of nearer to or farther from the placenta, it is done in order that what is left of the cord may not be troublesome from its length, and may admit of the ligature being applied at a certain distance from the abdomen. Any cutting instrument may be made use of, and the scissors are used only because they are rather more convenient than a bistoury. Although a rusty instrument cannot possibly occasion any redoubtable accident, such as tetanus, as A. Leroy supposed, it is nevertheless best to make use of such only in cases where sharper ones cannot be obtained; on the other hand, there could be no advantage obtained by tearing off, bruising, or sawing off the cord, as some authors, and Le Bas especially, have recommended, with the view of more closely imitating the quadrupeds, even should we intend to dispense with the use of a ligature.

The cord being cut, it should be squeezed between the forefinger and thumb, if there should be any disposition in it to bleed; the other three fingers take hold of the breech; the other hand is placed under the shoulders, and nape of the child's neck, which is thus removed from the lying-in bed, and commonly deposited on the nurse's lap; there it can be examined at leisure. Previously to putting on the ligature, we ascertain that no loop of intestine has got out through the umbilicus, that there is not an omphalocele. Should such a tumor exist, we ought to try to reduce it, or at least not to include it within the ligature we are about to place on the cord, as happened to some children under the notice of Trew, Sabatier, Martin de Bazas, Madame Boivin, and to Dupuytren in two cases at the *Hôtel Dieu*. The bladder itself, as is proved by an observation by Peü in 1648, can also become strangulated if it is prolonged into the cord. May not some of the congenital urinary fistulæ at the umbilicus depend upon this accident?

In the time of Aristotle and Fournier, the midwives were in the habit of forcing the blood contained in the cord into the belly of the fœtus before they tied it, and pretended, by means of this practice, which had been revived at the commencement of the present century, to restore strength and vigor to feeble children. Saucerotte, who was opposed to infants sleeping with old people, maintained that before tying the cord the blood should be pressed up towards the placenta.

Some again have maintained, along with Rhazes and the other Arabian physicians, with Mesmer and M. Sarton, that this blood ought to be very carefully squeezed out instead of forcing it in; that it is particularly necessary to evacuate the kind of serosity or lymph, more or less of which is contained in the cord, either by making punctures in it, or squeezing it with the fingers, either naked or covered with a piece of rag, for they attributed to the retention of these matters the property of producing the small-pox, crusts on the head, tetanus, and convulsions. Levret, also, thinks that by squeezing out these humors we may prevent the occurrence of infantile jaundice, that at least which he compares to ecchymosis; but this opinion, which M. Désormeaux seems to partake of in some measure, cannot be maintained, and scarcely deserves to be discussed.

ART. II.—LIGATION OF THE CORD.

As to the ligature itself, De la Motte and Guillemeau advise us to apply it at the distance of one inch; Deventer, Levret, and the moderns at the distance of two fingers' breadth; others at three, four, five, six, and even twelve inches from the abdomen. Some persons have recommended the application of two, and in such a way that the one nearest the abdomen should not be so tight as the other. Sometimes it has been recommended to draw it very tightly, at others very loosely. One person is content with a single turn and a single knot; another thinks there should be two turns and a double knot; a third, like Plenck and M. Désormeaux, makes first one turn and one knot, and then bends the cord into a noose to tie another knot upon it. Deleurye, who maintains that the cord should be cut at once and without ligation, afterwards applies three ligatures at some distance from each other. Denman applied two ligatures about three inches from the umbilicus. Barbaut places one five or six inches from the umbilicus before removing the placenta, and a second, four fingers' breadth from the first, and cuts the cord between the two. Martin, comparing the umbilical cord to an artery, which we wish to obliterate after birth, recommends a round ligature instead of a flat one; and also that it should be placed at a certain distance from the abdomen for fear of including in it the portion of skin which projects from the umbilicus. Some would not dare to use anything except tape, whereas, wiser persons make use of what they can find at hand; but in fact, is this ligature really necessary?

No animal can have recourse to it. At the period of the conquest of Brazil, travelers reported that the aborigines merely chewed or tore off the cord with their teeth, and that they did not tie it up. If a careful attention be paid to what happens after an ordinary birth, it will be seen that the pulsations grow weaker and soon disappear in the cord, beginning at the placenta, and that after a few minutes it may be cut without being followed by the least hemorrhage. This remarkable phenomenon, which is attributed to the change of direction of the iliac arteries, and to the difficulty experienced by the blood in passing into the aorta through the *ductus arteriosus*, and into the cord through the umbilical arteries, always takes place where everything occurs in a natural and regular order, but in reality depends upon the circumstance that the attractive force exerted by the placenta upon the blood is replaced by that of the respiratory organs, and that the after-birth is no longer anything more than an inert substance, without vitality, which is abandoned by the blood, as it abandons a gangrenous or asphyxiated limb.

It is so independent of any mechanical change in the arrangement of the vessels, that if, as was done by Vesalius, the belly of an animal at the full term of gestation be opened, the pulsations of the cord are seen to continue as long as the fœtus continues to live without respiring, and, on the contrary, to cease as soon as the air enters freely into the lungs. Bécларd has seen the same thing in the dog. I once received a human fœtus, at the sixth month of pregnancy, enclosed within its membranes. The umbilical arteries continued to beat strongly as long as the membranes were unruptured; but they fell into inertia as soon as the lungs and chest, upon coming in contact with the air, attempted to perform some respiratory movements. And do we not every day see the blood flow or stop spontaneously in the same child, according as the respiration is free or embarrassed?

Whatever may be the fate of the explanation, it is not the less true that, if the cord were left to itself without any ligature, it would not expose the fœtus to any hemorrhage, or any accident, even although it should be cut off clean, and not contused or torn. Fanton and Schulze, who reject the ligature as useless, have proved it beyond a doubt. Carbone maintains the same doctrine, and reports a number of cases in its support, and it is the same with Sedillot, who does not tie the cord for some time, and then only out of respect for the persons present. Girard, Cantharel, and Maisonnabe of Montpellier, have discarded it without any inconvenience. Hancock, who disputes the necessity of ligating the cord, even attributes to it tetanus of the new-born child. However, as the contrary may happen; as a mere compression of the chest, or an embarrassed state of the function of any organ suffices to disorder the general circulation, and enable the blood again to pass through the umbilical ring; as cases are reported of children who have died from bleeding in consequence of the cord being not well secured; and lastly, as there is no danger occasioned by the application of a ligature, as it presents no difficulty, we are not authorized to dispense with it; we should even be culpable were we to neglect it. Although the observations of Fanton and Schulze prove that it is not indispensable, those of Daniel prove that it would not always be safe to omit it even after a rupture of the cord. In a case which Mauriceau cites, the loosening of the ligature brought on a hemorrhage which caused death in two days. A similar accident has taken place at the end of twelve hours, under the observation of Desglan; and Berenger, of Carpi, is said to have seen young asses and colts perish from the same cause. Merriman relates two cases similar to those of Mauriceau. The ancients were, moreover, so convinced of the utility of this ligature, that the midwives were called "cord-cutters" among the Greeks; and Aristotle considered their ability to tie the cord as their highest qualification.

Further, whether tied or not, the cord constantly separates from the abdomen

at the same place, that is to say, at the spot where it joins the skin, and consequently a few lines beyond the surface of the belly.

I always make one turn of the ligature, which I tie with a single knot sufficiently hard to close the vessels; I then carry the two ends behind, cross them and bring them back again in front, where they are secured by a double knot which is tied somewhat more firmly. I pursue this method because it is very simple, and because I have never seen it followed by any accident. But if the cord were a very large one, I would willingly, for the sake of greater security, imitate the conduct of Désormeaux and Plenck, that is to say, after tying the first knot, I would make a loop of the cord, and secure it in the second turn of the ligature.

Besides this ligature, some practitioners apply one to the placental end of the cord, to prevent, as they say, any hemorrhage from taking place from the woman. But what I have said concerning the utero-placental vascular system proves that this is an unnecessary precaution. It can be of no use except in twin cases, and even there, to make it necessary, the vessels of one placenta ought to communicate directly with those of the other, as appears to have been the case in two instances met with by M. Mancel, but which must be a very rare occurrence. Chevreul, Désormeaux, and others have met with examples. Smellie has already remarked that, in simple pregnancies, a ligature on the placental end is useless. Agreeably to his doctrine of the connection of the placenta with the mother, Burton follows the same practice. Lemoine, who admits a direct communication between the placenta and the mother, holds the opposite opinion. Millot, agreeing with Lemoine, says that the ligature on the uterine end of the cord favors the separation of the placenta by retaining the blood in it. This is also the opinion of Chevreul, who says that he has made many experiments upon this subject. White, who dislikes the ligature, pretends that, when left off, the delivery of the after-birth is hastened in consequence of the escape of blood from the placenta, and Bodin says also the same thing.

As to twins, Guérin d'Illiers tells us that two children were born alive at eight days' interval, although the cord of the first was not tied; in another example, which Burton reports, two children were born nine hours apart without ligatures and without hemorrhage. We therefore see that the ligature is not indispensable except in the rare circumstances which I have pointed out. In a labor with three children, Columbus states that no hemorrhage took place from the placental end of the cord, although it was cut immediately after the escape of each child, and the three fetuses were born alive.

SECT. II.—OF CLEANSING THE CHILD.

Without undertaking to decide whether our first parents took the trouble of removing the unctuous matter which covers and soils the skin of the foetus at birth; without recurring to the question whether, as is supposed by M. Richerand and most of the modern physiologists, this substance is a mere result of the sebaceous secretion, rather than a deposit of some principle contained in the liquor amnii, as is supposed by the chemical physicians in accordance with the sentiments of M. Vauquelin, I will say, notwithstanding the ideas of Gaultier de Claubry and Deleurye, that none but beneficial effects can follow its removal. If it were the intention of nature to retain it upon the surface, why would the goat, the cow, and so many other animals lick their young so carefully and sometimes so rudely as soon as they are born? I know that no very serious inconvenience would follow should it be left adhering to the surface, and that it would come off in a few days by sticking to the clothes, or with the epidermis to which it adheres, and which always desquamates within the first few weeks;

lastly, I do not believe its presence can have any great influence in producing scabs on the head, *crusta lactea* of the head in children at the breast, or crusts on other parts of the body; nor, consequently, that it is absolutely necessary to remove it with scrupulous minuteness, even to the very smallest portion; but I think that none of it ought to be left, except in certain spots from which it cannot be readily got off.

Where nothing is made use of but a napkin to wipe it off, some portions always remain adhering to the skin, unless it is rubbed so long and so violently as to be sometimes dangerous; nor can we succeed much better by immersing the fœtus in a warm bath, unless it be composed of a mucilaginous or saponaceous fluid.

It should be first diluted and thinned with a little fresh butter or oil, mucilage, or any kind of grease, or, what is still better, the yolk of an egg, which renders it miscible with water. A weak solution of soap and water might also be made use of very properly, but the other substances are preferable. This ceruminous substance is met with in greatest abundance at the principal bends of the limbs, and on the head and neck; when it is well detached from the body, it should be gently wiped with a dry napkin; after which, in order to finish the cleansing of the child, we may first merely rub its skin with a soft sponge dipped in warm water, or weak wine and water, and then again with the sponge squeezed dry, to clean off any blood or other matter adhering to it. The washing with red wine, as recommended by Dionis, is perfectly useless.

Some persons think the whole child should be plunged into a bath, and I do not see why the accoucheur should refuse this little gratification to the parents when they desire to have it done: if I generally neglect it, it is because it takes up too much time, and assuredly does not deserve to be made of so much consequence as is done by some accoucheurs.

It is difficult to conceive how certain grave authors can defend the conduct of the ancient people of Germany, Britain, Scythia, and Greenland, and recommend the Lacedæmonian custom of plunging the fœtus into cold water or ice-water, or even to roll it in the snow immediately after its birth, as appears to be still the practice in some remote districts of the vast empire of Russia. The vigor and the robust constitution of those people depended upon their diet and the exercises to which they were accustomed. If they had among them no weak and delicate children, that may be accounted for, not by saying that the cold bath gave strength and health to weakly children, but that those that were weakly at first soon died, and that none remained but such as were endowed with more vigorous constitutions. It may be seen, from the work of MM. Edwards and Villermé, how much cold weather increases the mortality of new-born infants. This practice was quite a natural test among a people who desired to have in their republic none but strong citizens, and looked upon infirm men as more troublesome than useful. But in our present state of civilization the most robust men are not always those who perform the most important parts in the state; it is no longer allowable to be careless of the life of any individual; and every child, whether delicate or vigorous, has an equal right to the protection of its parents and of society in general.

Medicated, alcoholic, or strengthening baths, in use since the time of Avicenna and Fournier, seem to me to deserve the same reprobation, as a general rule. If they are strong, they deprive the skin of its suppleness, interfere with the expansive movement of the fluids, and may give rise to the most serious accidents; if weak, they at least do no good, and I should not make use of them except where the fœtus might be excited in a general manner, so as to communicate a greater degree of activity to its languid functions. Thus, except under particular indications, lotions and baths of plain warm water are the only ones that prudence permits us to recommend.

SECT. III.—OF DRESSING THE CHILD.

The fœtus, being washed, cleaned, and wiped dry, still requires some attention ; the accoucheur should direct its first dressing ; he should at least superintend the application of the belly-band and the dressing of the cord.

The form of this compress, in itself considered, is of little consequence ; Baudelocque directs it to be made double, and that a pretty deep cut of a half moon shape should be made in the folded edge with the scissors ; that, after splitting one of the halves from the hole quite out to the end, the root of the cord should be lodged in the space between ; that the part not split should remain below, and the two halves of the divided portion should be turned over and crossed in front ! There is another method. Let the compress be placed at the upper and left side of the abdomen, rather than at the right, on account of the presence of the liver ; a second compress, soft and of a square shape, covers the first ; a band as wide as three or four fingers, and long enough to go once and a half round the belly, keeps the whole in place ; this band is fastened at the side rather than at the middle of the belly, with a pin, which is far from being so dangerous as some persons have supposed, or it may be secured with a needle and thread. If drawn too tightly it would do harm, if too loose it would slip off and do no good. This little apparatus, the object of which is to prevent the cord from being pulled or stretched, and from sticking to the skin, ought to be continued or reapplied until the cord drops off. It may even be continued for some days, some weeks, or months afterwards, provided the navel projects too much, or there is any danger of an omphalocele taking place. The cord generally separates from the navel about the fifth day ; but in some children it takes place as early as the second, while in others it does not happen until the ninth or tenth day. It begins to dry at its loose end, as has been correctly observed by MM. Billard and Orfila ; the gelatin which it contains contracts upon the vessels, which are soon somewhat strangulated by it, as far as the umbilical ring, and not by the epidermis, as M. Gardien supposed. Being reduced to a mere pedicle, which grows smaller and smaller, the vessels soon separate from the living parts, so that the gangrene of which Haller speaks, the contraction indicated by Gardien, the eliminative inflammation observed by Béclard, Chaussier, and M. Orfila, as well as the kind of putrefaction noticed by M. Denis, are merely accidental phenomena, and not the cause of the fall of the cord. When a small ulcer is left after the separation of the cord, it generally heals spontaneously in from eight to twelve days. All the ointments and waters recommended by the good women to force it to close sooner are of no use, and might even produce an opposite effect. It is sufficient to cover it with a piece of fine dry linen, or to sprinkle it over with a little flour or powder of lycopodium.

Previously to wrapping up the navel string, it was formerly the custom to begin to dress the child and cover the head, arms, and breast. Thanks to the elegant pen of Rousseau, it is rarely necessary for us at the present day to combat the employment of those absurd swaddling bands, still recognized and described by Levret, which render a new-born infant an immovable mass, a sort of doll which could be taken hold of by the feet and lifted up stiff. The reform upon this subject is carried so far in England that, instead of the barra-coat, they make use of a long frock, a sort of sac of fine wool stuff, which serves for the dress of the child. In France, they also put a shirt, or small woolen jacket, provided with a soft chemisette, which is fastened behind with pins ; it is then wrapped in a linen barra, and another made of wool or cotton. These barras come up as high as the axillæ, and go once and a half round the body, and cross in front all the way down ; the end is then folded up so as to reach quite

to the upper part of the breast, and the corners are carried round behind, to the back, where they are also fastened with pins.

However, all these matters belong rather to the women, and particularly the nurses, than to the physician. Provided that the child is comfortable, free in its motions, the dress soft and warm, it is of small consequence what shall be its form, nature, or arrangement; everything over and above these points should be left to the taste or caprice of the family or assistants.

SECT. IV.—SUCKLING.

If the child is to be nourished by the mother, it should be put to the breast as soon as possible; but if not, it should remain twenty-four or even thirty-six hours without taking anything except a little sugar and water, or barley water with a small portion of milk in it.

We should not give it a spoonful of syrup of chicory or of peach blossoms in oil of sweet almonds, as was the custom formerly, unless it does not pass the meconium for two or three days.

To nourish it artificially, we should prefer the tubes covered with cork, made by Darbo, and good cow's milk, to any other means.

Should a wet nurse be employed, she should be of a dark complexion rather than blonde, strong, of a mild and affectionate disposition, from twenty to thirty years of age, and her milk should be rather older than that of the mother.

ART. I.—ARTIFICIAL NIPPLES.

Besides cracks and excoriations, the absence or bad conformation of the nipple may require the employment of artificial teats; and although the child does not suck so well at first, the mother suffers infinitely less, and after a time recovers. The construction of artificial nipples has recently been very much perfected.

Madame Breton makes them of the skin of the cow's teat, which is very soft and very suitable for feeble children, but which becomes so closed as to prevent suction by the pressure of the lips of strong infants.

Those of Salmer, made of gum-elastic, are more simple and solid, but have an appearance and odor which are repugnant to the new-born child.

Those of Darbo made with cork are the best, their only inconvenience being their hardness and fragility.

ART. II.—BREAST PUMP.

If the nipple is really too short, we should not hesitate to use a breast pump to draw it out. This is a kind of cup armed with a long tube, which the woman can employ herself by sucking. That which Coutouly has invented is less valuable than that of Darbo, as the tube of the latter, made of caoutchouc and covered with silk, is flexible, in place of being made of glass, as the breast pump which is generally in use.

When there is too much milk, it is better to have recourse to the liniment of Ranque (of laurel water $f\bar{z}ii$, extract of belladonna $\mathfrak{Z}ii$, ether $f\bar{z}i$) than to the internal administration of the extract of cicuta, which d'Outrepoint recommends. Purgatives, and the use of dry vegetables, as beans and lentils, are at the same time suitable.

SECT. V.—ACCIDENTS DURING LACTATION.

ART. I.—EXCORIATED NIPPLES.

A woman who nurses is liable to certain accidents of the nipples. Those who suckle for the first time are especially liable to cracks. A mixture of equal parts of lime-water and sweet oil is the best liniment to employ in such a case: the mixture of oil and wine (*baume du samaratin*) is also very applicable, and the same may be said of the ointment of poppies. M. Gass says that in Strasburg they succeed best with the nitrate of silver; but we must be careful how we use corrosive sublimate in the proportion of two grains to the ounce of water, as Feist is not afraid to recommend.

If the child is not allowed to suck, the cracks yield readily to suitable means, or even spontaneously. In opposite cases, they generally resist everything, and the employment of artificial nipples is the only efficacious aid which we can give the woman. A cerate which M. Ledoux says he has employed with the greatest advantage, is thus composed: mucilage of quince and alcohol, poppy ointment, cerate, and nut-galls, in suitable proportions to make a pomade of the usual consistence.

ART. II.—ENGORGEMENT OF THE BREAST.

The breasts of a nursing woman become engorged in different ways; sometimes they become all at once knotted, moderately painful, and without change in the color of the skin, the milk seeming to curdle in the ducts; at other times, the swelling, less rapid, and generally less extended, is accompanied with pain, throbbing, heat, and lancination, as in active inflammatory tumors.

In the first case, it is necessary to cover the breasts with wadded cotton and warm cloths, and to apply the child to them frequently. If this does not answer, we may rub them with half a drachm of ammoniac mixed with the yolk of an egg; so soon as the swelling becomes very painful, on the contrary, we should resort to poultices of flaxseed or of crumbs of bread, to leeches in great numbers, to venesection even, and indeed to active antiphlogistic treatment.

ART. III.—PHLEGMONOUS INFLAMMATION.

In women who do not nurse, the *engorgemens laiteux* run speedily into phlegmonous inflammations; but this only takes place from the sixth to the tenth day, while in other cases they may occur during the whole course of lactation. Whether in one or the other case it is necessary to open them deeply, rather too soon than too late.

When all engorgement of the womb has passed off, and it has regained its natural size, that is to say, at the end of six weeks or two months, menstruation is re-established as before pregnancy. Lactation seems to take the place of this phenomenon in the mother who nurses her child: there are many in whom, however, lactation does not put a stop to the menses, and who, as Burton says, as Lemoine maintains, and as I have myself seen, enjoy, nevertheless, good health, but are more easily fatigued.

CHAPTER II.

OF THE FŒTUS IN A STATE OF DISEASE.

THE fœtus may be born weak, or even in a state of apparent death; the treatment it shall receive under these circumstances should vary according to the danger and the nature of the accident which compromises its life.

SECT. I.—OF ASPHYXIA.

If the child is only weak without being actually sick, it should be treated in the way that has already been directed; only we should sooner attend to putting the finger in the mouth so as to cleanse it from any mucus contained in it; great care is to be taken to avoid cold; a little wine may be added to the water to be used in washing it, and nothing is to be done that might in any way whatever interfere with the freedom of its respiration.

ART. I.—CAUSES.

But the weakness may be carried to the extreme; sometimes the fœtus neither cries nor respires; its skin is pale; the circulation is languid, the heart scarcely beats; and but for the heat which remains, and the obscure motion of umbilical arteries and heart, the death of the child would be evident.

This is the state which is called *asphyxia of new-born children*, which M. Gardien prefers to denominate *syncope*, and which others have denominated *anemia*; but which in fact differs from those three morbid states in a great many respects, and which, rigorously speaking, is much more nearly allied to the latter than to the two former.

It is met with particularly after very prolonged delivery, where the child has been turned, when it is born before the full term, where there has been a flooding during labor or several days before it, especially that kind of flooding which is caused by implantation of the placenta over the os uteri, or that which comes direct from the vessels of the cord.

Its cause therefore is, on the one hand, a deficiency of blood, which does not pass through the brain and lungs in sufficient quantities to keep those organs in a state of action; on the other, the want of incitation of the inspiratory muscles, and perhaps, also, in some cases, the presence of too great a quantity of mucus, or water of the amnios in the trachea, as supposed by Heroldt and Scheele. M. Désormeaux seems to agree with Fréteau, that the compression of the cord may also occasion it, by closing the passage for the blood in the vein, whilst it leaves the arteries more or less permeable; but I have elsewhere shown what ought to be thought of this view of the subject.

Upon the whole, it seems to me that asphyxia of new-born children ought to be attributed to the affection suffered by the blood in the last moments of the labor, its placental modification, and its having ceased to be subjected to that sort of internal respiration which, under ordinary circumstances, is kept up, until the real respiration becomes positively established.

ART. II.—TREATMENT.

It is not by forcing the blood along the cord toward the belly that we should undertake, as Aristotle maintains, to resuscitate the child. Peu has already shown how ridiculous was the practice, which consisted in placing on the belly of the child the placenta still warm, or heated up, whether in hot ashes or in boiling wine, as Guillemeau and Portal direct. If the midwives demand its lips to be rubbed with a piece of gold, as Peu says, it is only to get a chance of slipping it into their pockets. Smellie advises that, if the child breathes with difficulty, the placenta should at once be delivered and placed with the child in warm water. The first thing to be doné is to remove the viscid mucus from the mouth by means of the finger, or with a brush either dry, or dipped in a solution of common salt; there is no reason to believe that it is either safe or useful to turn the fœtus with the face downwards to force the matters contained in the trachea to escape therefrom, or to suck them out into a tube, as Heroldt and Scheele state that they have done.

§ 1. CIRCULATION AND HEAT OF THE PLACENTA.

Where there is reason to believe that the placenta still maintains a part of its natural relations with the womb, and especially where there is still some tremor, some pulsation in the cord, we may follow the advice of Levret, Smellie, Fréteau, Piet, Chaussier, &c., not to cut it too soon; but if the womb be well contracted, if the adhesions of the placenta be evidently destroyed, it would be better to separate the fœtus at once from its mother. The fact related by A. Petit, wherein he saw the child in some measure die and revive again according as the cord was compressed or free, to command our entire belief, would require a fuller detail of all the accompanying circumstances. Supposing that the secundines are either wholly expelled, or on the point of being expelled, and that there should be still some pulsations in the cord, I should not object to keeping them for some time in warm wine and water, as again recommended even in our own day by many authors, as MM. Beauchesne and Dorthal among others; but in other cases I cannot perceive any advantages in acting thus.

§ 2. REVULSIVES.

As it is important for the fœtus to preserve what little blood it has, the cord should be tied previously to cutting it off; the child is to be immediately taken out of the mother's sight; it should be taken near a good fire, or it may be plunged up to the axillæ in a warm bath, rendered somewhat exciting by the addition of a little wine or brandy; we should give it slight shocks by slapping it with the flat of the fingers upon the breast, the back, or the breech; the cord should also be gently pulled in such a way as to remove the diaphragm a little. Van Swieten speaks of midwives who applied the mouth to the left nipple of the child, and derived great advantages from suction performed on this or other parts of its body. Instead of the mouth, a cup might be made use of. This practice, which was reinstated by Saccombe, M. Désormeaux thinks may be of some use, by exciting the action of the muscles; but it cannot produce, as is pretended, a real mechanical dilatation of the chest. The temples, the nostrils, the forehead, the root of the neck, and the spine, ought to be rubbed with the fingers dipped in Cologne water, alcohol, &c., or with a pretty stiff dry brush; the inside of the mouth and nose are to be stimulated by the introduction of vinegar, brandy, or some other irritating liquor, or merely with the barbs of a dry feather. I have, in imitation of M. Désormeaux, advantageously employed a mouthful of spirituous liquor, held a few moments in the mouth and then spirted with force, in the form of a *douche* or ablution over the breast of the child: the smoke of burnt linen or paper introduced into the rectum has been

beneficially employed in some cases. Some onion or garlic introduced into the anus, the mouth, or the nose, produces nearly the same effect, and is not so dangerous as ammonia or radical vinegar, which promptly act as caustics if not largely diluted with water. The belly and thorax should be simultaneously and properly pressed so as to try to induce the diaphragm to contract; and during all these processes the fœtus should be always kept very warm, for without this precaution the action of all the other means will generally be inefficacious. We should persevere with them for a long time, and not get tired, and redouble our patience as soon as the least sign of life becomes manifest; sometimes the efforts of the accoucheur are not crowned with success until after they have been continued half an hour, an hour, or even two hours, and cases are not wanting where children, after being several hours abandoned as dead, have come to life, without any other succor than the temperature of the place where they were deposited. G. De la Tourette says he did not succeed for three hours in a new-born infant, which finally lived.

§ 3. INSUFFLATION.

When these different means prove ineffectual, recourse is to be had to inflating the lungs, which may be done either through a quill-barrel, a female catheter, or any kind of canula introduced into the mouth and nostrils, or by merely blowing with the mouth directly into the air-passages. The laryngeal tube invented by Chaussier, particularly the one modified by M. Guillon, having the advantage of pretty exactly filling the glottis when introduced into it, is better than the straight canula of Heroldt; but a simple gum-elastic catheter, an instrument which may be got anywhere, is almost as convenient; it is introduced *through the mouth*, as far as the bottom of the pharynx; then, while it is passed onwards, the point of it may be bent with the little finger, so as to compel it to enter into the larynx rather than the œsophagus; when fixed right, the nostrils and mouth of the fœtus are closed, and the inflation commenced. However, if it should be admitted that the experiments tried by Winslow, Heroldt, Schœle, Viborg, Schmidt, and Beclard, incontestably prove that the liquor amnii penetrates during intra-uterine life as far as the bronchia, it would perhaps be useful to free the trachea from it by suction or otherwise, previously to trying the effects of inflation; but there is still too much uncertainty upon this point for it to serve as a basis for any practice whatever.

Curry, Chaussier, and others had at first thought that by blowing into the mouth none but vitiated or more or less changed air was forced into the lungs of the fœtus, and that it would be better to make use of a bellows; but it was soon found that all these precautions were useless, that air, slightly warmed in the lungs of an adult, and charged with a gentle humidity, would be more congenial to the lungs of the child than a drier and colder air. Besides, Heroldt and others have proved that the gas given out by expiration contains only one-hundredth less of oxygen than atmospheric air.

As it is important that the air should enter the lungs and not the alimentary canal, an assistant ought to press his hand against the larynx, so as to keep it against the cervical vertebræ, and flatten the œsophagus as much as possible.

We should blow at first very gently. When the lungs are sufficiently filled to lower the diaphragm and raise the sides of the thorax, as is done in a natural inspiration, we must stop, and gently compress the abdomen and breast in imitation of the act of expiration. We then begin again in the same manner, and thus establish a sort of artificial respiration, the advantages of which have certainly been exaggerated by some authors: M. Désormeaux has been but imperfectly satisfied with it, and in my hands it has succeeded in but a small number of cases, and according to the researches of M. Leroy d'Etiolles it is really dangerous unless managed with very great care. Sage, who invokes the experi-

ments of Géraud and of Portal, has maintained that insufflation rarely succeeds, and that it is not without disadvantages.

In fact, it is not the action of the lungs, but that of the respiratory muscles that ought to be first put in play. But, as the very reverse takes place in inflation, it follows, according to M. Leroy, that the air generally stops in the large branches of the bronchia, and that we can rarely succeed in forcing it into the air-cells, without the risk of producing an emphysema, which of itself is sufficient to occasion the death of the individual.

§ 4. TRACHEOTOMY.

The operation of tracheotomy, proposed, in despair of anything better, by M. Heroldt, as it is very dangerous in itself considered, offers no advantages superior to simple inflation, and ought to be proscribed.

§ 5. ELECTRICITY AND GALVANISM.

Electricity and galvanism, which have been recommended under these circumstances by Grève, Behrends, Boer, M. Gardien, &c., might also be of great service either as a principal or accessory cause in the treatment of the asphyxia of new-born children. The current should be directed through the breast, or from the mouth to the anus. I must, notwithstanding, confess that I have twice tried it without success, although I made use of a double battery of twenty-one metallic plates, the action of which was very strong. The electro-puncture, which was tried by M. Leroy on animals, might perhaps be more efficacious, by permitting it to act directly upon the diaphragm; but, so far as I know, it has never been applied to the human fœtus.

If we are to succeed, the pulsations of the heart and cord reappear by degrees, the muscles gradually recover their natural firmness, the skin becomes slightly colored, the heat returns, and then some respiratory movements, feeble and irregular at first, then more and more decided, soon make their appearance; cries are soon heard, and the child is saved. It would, however, be imprudent to cry out victory too soon; I twice succeeded in restoring the motions of the heart and the respiration for more than three hours, by means of inflation and galvanism, in two children, which I nevertheless was at length compelled to abandon.*

SECT. II.—OF THE APOPLECTIC STATE.

Instead of coming into the world pale, anæmic, or exsanguious, the child is sometimes born in quite a contrary condition; its skin is of a bluish-red or liver color, of various degrees of intensity, especially on the face, and appears as if thickened. All the organs seem to be the seat of a general congestion; the limbs are soft and motionless; the circulation is suspended, either wholly or in part, in addition to which, all the other signs just now indicated are found to be present.

ART. I.—CAUSES.

It should also be understood that the disease may exhibit itself under various degrees of intensity, and produce various changes in the interior of the body. Upon opening the dead bodies of such children, fluid blood is often found extra-

* There are a great many real resources for the recovery of the child, but they are often applied without success, because they are persevered in after the signs of death are complete. In general, it is safe to abandon all attempts to resuscitate, if there be no audible pulsation of the heart, no sensible beating of the umbilical vessels close to the belly—if the child be without muscular tone or resistance—and especially, if the sphincterian contraction is gone. But no truce should be allowed while there remains the least sign of muscular action in any part of the body.—M.

vasated between the meninges or in the very substance of the brain. In other cases, and that most frequently, the blood is not found to have escaped from the vessels, or only forms slight ecchymoses in different parts; but it is in excess in all the organs, which are engorged, and, as it were, soaked in it.

The apoplectic state is met with, especially in strong children, after long and difficult labors, the application of the forceps, and pelvic labors, either spontaneous or artificial; where the child has remained for several hours under the influence of the uterine contractions after the discharge of the waters; where it has presented in a bad position; where it is too large to pass with ease through the various passages; where a loop of the cord encircles its neck, or is itself in any way compressed, and particularly where any of these accidents occur coincidently with a previous plethoric state.

Its immediate cause is the compression or engorgement of the brain; which, however, does not prevent a want of the revivification of the blood from being an occasional cause of it, as well as of asphyxia; and M. Gardien, while opposing the sentiments of Chambon, Courraut, and Capuron, is certainly wrong in maintaining that compression of the cord is as incapable of producing the apoplectic state as it is capable of easily producing asphyxia.

ART. II.—TREATMENT.

When a child is born in this state, we should make haste to disengage its vascular system; by acting soon where there is no effusion, the alarming symptoms may generally be soon dissipated. Under the opposite circumstances, death is commonly inevitable; but, as has been remarked by M. Désormeaux, inasmuch as it is impossible, *a priori*, to distinguish a simple congestion from an encephalic hemorrhage, the accoucheur would be reprehensible who should fail, in any case, to bestow upon the child the same care as if the affection were known to be less serious.

If the accident have been occasioned by compression by the cord upon the jugular vein, the turns should be quickly cast off, or cut, provided the fetus cannot be otherwise freed from their injurious effects. In other cases, it would be equally dangerous to wait for the child to cry before cutting the cord, or to amuse one's self with immersing the placenta in a warm liquid. The section of the cord is the first and chief remedy to be resorted to. The ligature is not to be applied until after the disappearance of every bad symptom, because the advantage of this section is that it gives free issue to the blood. To promote the escape of this fluid, it is sometimes requisite gently to press upon the breast, the abdomen, and the cord itself, the section of which we refresh from time to time with a clip of the scissors, as M. Champion has recommended, and has often done successfully. As the blood flows, the child seems to revive; the livid color of the lips is soon replaced by a purplish or rosy hue; the parts about the mouth and nose, the rest of the face, and the whole surface of the body, clear up by degrees; the respiration soon becomes established, and in a few minutes the danger has wholly disappeared; but the circulation is sometimes so much enfeebled and obscure that no blood flows from the umbilicus. In such cases, we are obliged to resort to the remedies recommended for asphyxia, that is to say, to frictions, stimulating baths, inflation, electricity, &c.; and as it is absolutely necessary for the child to lose blood, provided it be impossible to obtain any from the cord, a leech should be applied behind each ear to disengage the brain.

When the integuments have recovered their natural color, the circulation has returned to its natural state, the respiration is no longer doubtful, and the fetus cries and moves freely, the bleeding must be stopped, provided it should not have stopped of itself. After this, we proceed as if the child had been born well. On the contrary, should there still remain some obstruction in the pulmonary

and cerebral functions, as has too frequently been noticed, especially where we have been unable to procure a sufficient quantity of blood, leeches ought again to be applied, and are almost the only agents upon which we can place any reliance, in cases where congestion, a sort of secondary apoplexy, does not come on until twelve, twenty-four, or forty-eight hours, or even, as has happened, until three or four days after its birth.

SECT. III.—DIFFERENT ACCIDENTS.

Hemorrhage from the umbilicus, with the new-born infant, is a grave accident. Defect in the knot, relaxation of the ligature, and pulling away of the cord, are the ordinary causes. It must be remedied by compression : small wads of charpie pressed upon the bleeding point, a pledget, or a compress four double, and a bandage moderately tight, answer ordinarily.

If, after the *falling off of the cord*, there remains a slight sore, we may simply sprinkle it with lycopodium, magnesia, or farina. Cerate, the white ointment of rhais, and lead water, are only admissible afterwards.

Before dressing the infant, we must carefully examine, in order to ascertain whether it does not exhibit some deformities, or some *fractures or luxations*. If the eyelids, the lips, the urinary passage, or the anus are adherent, it is necessary to re-establish these orifices by suitable operations.

And the same is to be done in *tongue-tie*, which should be cut with the scissors whilst the end of the tongue is elevated with a suitable instrument, taking care to cut rather downwards than upwards, so as to avoid the ranine arteries. When the child can extend the tongue to the borders of the lips, and take hold of the end of the finger, this little operation is useless, and should never be practiced; for children do not always suffer from tongue-tie when nurses say so.

ART. I.—DEPRESSION OF THE BONES OF THE CRANIUM.

The *depression* of the parietal or frontal bone, with or without fracture, has been several times observed at the *Maternité*, at Paris, by Chaussier, M. Dugès, and Madame Lachapelle. I have also given two examples, when speaking of version and of the forceps; and in a case related by André, where the forceps was employed, the fracture took place across the frontal bone; a stellated fracture of the parietal bone took place in a fœtus during a difficult labor, noted by Siebold. A depression may also exist without fracture. There is reason to fear its occurrence when the head rests against the sacro-vertebral angle, and is for a long time subjected to violent efforts, when the strait is *reniform*, and when a pretty large head is forced to mould itself to the form of the pelvis through which it passes.

If the fracture or depression of the bones is not accompanied with extravasation, nature ordinarily succeeds in restoring everything to its proper condition, and performs the cure herself; otherwise death is the common consequence, or, at least, there ensue stupor and a very great tendency to convulsions.

By moulding itself according to the contracted straits, the head may be elongated without its bones being depressed or fractured, but in such a way that their edges cross and over-ride one another, more or less; in these cases, they pretty often recover their natural position after the delivery; but they may also continue to over-ride, as occurred in one case under my own notice, and thus constitute a perpetual cause of disease, particularly of convulsive affections.

However, in this, as in the preceding cases, art can do nothing, and we are obliged to trust to the powers of nature.

In passing through the pelvis, the fœtus runs another risk, which has lately been much insisted on by Radford. When the compression has especially taken place

in the occipito-frontal diameter, the brain is pushed back in a direction opposite to its principal fibres, and the circulation in the longitudinal sinus becomes much embarrassed. The cranium is then much elongated, and the respiration, as well as the circulation, is established with difficulty: the encephalon is found softened, and blood is effused on the hemispheres of the brain, and on the cerebellum. Radford, who reports many cases of this kind, directs that the cord should be immediately cut, and that blood should be allowed to flow in abundance.

ART. II.—THE BLOODY TUMOR.

A more common, and fortunately less serious accident than these, is a sort of subcutaneous effusion, a *swelling of the hairy scalp*, which is almost always met with, but in different degrees, when the head has traversed the pelvic canal slowly and with difficulty; this tumor is generally found on that part of the cranium which occupied the open space in the pelvis during the labor; or one of the points that was longest and most forcibly pressed against the sacro-vertebral angle or pubis; it is composed in some cases of reddish serum, in some of pure blood, either fluid or coagulated, in others of a mixture of these fluids, and is of various sizes, from that of a nut up to that of a hen's egg or even larger.

It may be diffused or circumscribed, and it may be fluctuating, though generally elastic and dough-like, and commonly disappears without any assistance; sometimes, however, it suppurates, and is converted into a real abscess, which may end in denudation and necrosis of the cranial bones.

Being soft and compressible in the centre, and firmer and more elevated about the edges, it has, on more than one occasion, been mistaken for a fracture or depression of the bones, and excited useless alarm. But, since J. L. Petit, Ledran, and Levret have called attention to this sort of mistakes, they have become more and more rare.

When the tumor is of a small size, it should be left to itself, and disappears in the course of three or four days, leaving behind it only a simple ecchymosis; but its resolution may, and indeed should be facilitated, by keeping it covered with compresses dipped in salt and water, red wine, or brandy and water, some *eau-blanche* or some other medicine of the same kind. Should it be fluctuating and not very painful, it should nevertheless be resolved if possible; if the means above indicated do not suffice, they may be replaced by a solution of half an ounce of hydrochlorate of ammonia in a pint of red wine; this liquor, which is recommended by Siebold, and frequently employed by M. Boyer for bloody tumors of the knee, has many times succeeded in dispersing collections which it had seemed indispensably necessary to open.

However, should it not produce the effect expected from it, and the fluctuation increase, recourse must be had to the bistoury, as Levret recommends, and in such a case we ought not to wait too long, which would admit of the skin becoming more extensively detached, and much thinner. The wound should be dressed with lint, cerate, or cataplasms, that is to say, as we would dress an abscess or any sanguine collection of a common kind, and the wound generally heals very speedily. It is, indeed, an accident which has lately occupied so much attention that I must dwell on it for a moment. Although it presents the same characters wherever it is developed, the bloody tumor of the new-born child only requires attention when it occurs on the head, and it is merely of this that I shall here speak.

Moulaud, who describes these collections, has not sufficiently insisted on the principal varieties. Henschel, who recommends compression with a bit of lead beneath the cap, and who pretends that incision causes the death of the child, appears to me to have confounded it with *encéphalocèle*. Was not the pretended hernia of the brain, which Heustis says that he has cured by compression with a

sponge, as Dudley did before, a bloody tumor? The tumor also taken for hernia of the brain, of which Michel de Sémur speaks, was evidently nothing else. Covering, as it did, the posterior fontanelle and the two branches of the lambdoidal suture, it terminated in an abscess which was cured.

The case of *encéphalocèle*, reported by Trow, and another by Ledran, were nothing more than bloody tumors. In the first, there was a tumor on each parietal bone, and was cured by the application of resolvents; and that of Ledran, occupying the right parietal bone, was removed in the same manner. It was the same in the case published by Gageon, and in another by Michel, if, in this last, the bloody collection did not terminate by a spontaneous opening.

§ 1. VARIETIES.

A. The *first variety* of these tumors appears to me to be seated between the aponeurosis and cranial integuments. I, at least, found it so in four cases, in which I was able to make an examination, in adults, and in three new-born infants that I dissected. This is, probably, the most common of them all, and there are few accoucheurs and surgeons who have not observed it. The *caput succedaneum* of certain German physicians, as well as the bloody external tumor of the scalp of new-born children of Hære, very probably belongs to it. Separated from the bone by the sound periosteum, and retained within its limits by the density of the hairy scalp, it entails little danger, causes scarcely any pain, and often disperses of itself, or under the influence of the ordinary resolvents and compression. Opening it is rarely indispensable, and should be made according to the principles that I have laid down for the treatment of bloody tumors in general.

B. A *second variety* of tumors of the scalp, following delivery, is that which M. Nægèle describes under the name of *cephalæmatoma*, and which he places between the bone and the pericranium. It is because the German and Italian practitioners, who have been engaged in its study for twenty years, often confound this with the preceding, that they are so far from agreeing as to the dangers of the one or the other. At first, more or less large and projecting, it shows a disposition to become prominent, and is not always surrounded with so elevated a border as the first. Fluctuation is also more obscure, and the bones become often altered, and the aponeuroses sometimes furnish to it a regular cyst. We see that Michaelis has thus described it, while some remarks of Zeller and Nægèle evidently belong to the preceding variety.

As the bone may become exposed by the separation of the pericranium, we may conceive, with Zeller and Rust, that death will result. A more or less extended necrosis is to be feared, and the disease may even reach the dura mater; Paletta, Osiander, and Chelius have each had an opportunity of becoming convinced of this fact by an examination of the dead subject. It is by adopting this view that Michaelis could with reason attribute the tumor to disease of the bone.

We must not, however, be imposed upon by appearances. A child, ten days old, was brought to me by Madame Brunet, a midwife, about the end of August, 1833, supposed to be affected with hernia of the brain; a soft fluctuating tumor occupied the posterior fourth of the cranium, that is to say, the angle of the left parietal bone, a part of the temporal, nearly all of the occipital and the superior angle of the right parietal. Nothing at all was done for it, and it was resolved at the end of fifteen days. Red spots made their appearance on different parts of the body, and the child, from that time, enjoyed robust health; the bony circle which surrounded the tumor disappeared completely at the end of a week. It presented all the symptoms which M. Nægèle attributes to the *cephalæmatoma*, which he places between the cranium and its periosteum. Now, is it probable that a collection so considerable would thus terminate, if it rested absolutely on

the naked bones, and if it was not first separated by a layer of cellular tissue, of which we shall hereafter speak?

The unequal pressure which the head experiences, and the riding of the bones, one on the other, in traversing the pelvis during most labors, whether natural or artificial, are, without doubt, the most common cause of this tumor. If Baude-locque seems to attribute it to an afflux of blood towards the brain, it is because he has not paid any attention to its origin, not only as it regards the points compressed, but also as regards more especially the part which remains entirely free in the centre of the strait, which sufficiently explains it without searching for any other cause.

Whenever the tissues beneath the pericranium are not raised up, the absorption of the effused fluid takes place very easily. The treatment in use is, besides, the same as in the first variety. By opening the tumor a rapid cure is effected, if the bone is not altered; but when there is caries or necrosis, we can perceive at once the dangers to which the patient is exposed.

A child mentioned by Fried, who had a true *encéphalocèle* of the occiput, had also a bloody tumor on each parietal bone, between the pericranium and the bone itself, as the author says; the labor, in this case, had been laborious, the head had suffered for a long time, and the child was dead.

I have not admitted that this kind of the bloody tumor is most frequent; first, because it seems to me that the observations on which it is based belong in part to the preceding, if not to the following, variety; secondly, because the state of the tissues, in the cases which I have dissected, have shown me how we may be mistaken in supposing, as a primary alteration, what is often secondary; thirdly, because the layer of tissue beneath the pericranium is so thin and weak that it would tear before the tumor reaches its ordinary size; fourthly, and finally, because the disappearance of the disease is often too prompt and complete for us to suppose that its seat is immediately over the bones. I do not, however, altogether deny the possibility of its existence; I only think it less common than certain German pathologists seem to admit, and especially Busch, who, with Nægèle as his authority, does not hesitate to place its constant seat between the bones and the pericranium, and says that, when left to nature, these *cephalæmatomes* produce the death of the child by convulsions; which, fortunately, is rarely true.

C. The *third variety* of bloody tumor of the head is, from the first, more deeply situated. Chelius locates it in the diploe; but I think, with Høere, who is quoted by Rust, that it is far more frequently between the cranium and the dura mater. I have collected two cases, and I am sure that, if it is carefully attended to, its frequent occurrence will be met with.

The deposition on the internal face of the dura mater, undergoing the transformation of which Abernethy thinks it susceptible, and a case of which is said to have been dissected by Høere, may become also the origin of the fungous tumors of the head, the first detailed history of which was given by Louis.

§ 2. RECAPITULATION OF BLOODY TUMORS.

In concluding, the efforts, and the pressure during labor, giving rise to a deposit beneath the *skin*, the *aponurosis*, the *pericranium*, in the *substance of the bone*, or, still more deeply, on the *surface of the dura mater*, are the cause of nearly all the varieties of bloody tumors, indicated by accoucheurs, and described under the title of *encéphalocèle*, *cephalæmatomes*, fungus, or even atheroma.

F. Nægèle first made known the results of his observations in 1811; afterwards in the thesis of Zeller, the first monograph which appeared on this disease; then in a memoir which is found in the thirteenth volume of the *Journal Complémentaire du Dictionnaire des Sciences Médicales* (page 227) it was described.

In a letter, dated 20th March, 1834, this author writes me that all that he has stated in the first article on the nature of cephalæmatome—for example, that the tumor during the first days after labor increases in height; that it fills up more and becomes distended; that it is only met with on the parietal bone, and more frequently on the right than the left, and sometimes on both, but never on any other bone; that the base of the tumor never passes the suture; that the extravasated blood is always between the bone and the pericranium; and that, in cases where he has opened the tumor, the bone is always found smooth—is perfectly confirmed by his subsequent experience.

As regards the treatment, his observations have convinced him that, ordinarily, a cure takes place without the aid of art.

For many years past he has contented himself with applying over the tumor any aromatic application, as much to satisfy the parents as to protect the parts from any injurious applications.

It is only after fifteen days or two weeks that the tumor begins to diminish in size. Towards the fourth week it is observed evidently to resist pressure.

If it is pressed upon with the end of the finger, a pit is made which disappears after the pressure is removed, exactly as if it was made upon a ball of leather or parchment. The first who described this appearance was Schmitt, of Vienna.

As the tumor becomes harder, it flattens in appearance and diminishes in height.

According to the observations and careful researches of M. Nægele, the following is the natural course of this affection:—

1st. The detached pericranium becomes ossified on its interior surface.

2d. As the extravasated blood is gradually absorbed, the ossified pericranium touches the bone and ultimately unites with it perfectly.

3d. After six months or a year, a prominence may still be observed upon the part of the head which the tumor occupied.

4th. In children dying at the end of six months or a year, Nægele found, on dissection, that the parietal bone was much thicker at this than at any other point.

Since then I have observed five cases of bloody tumor, three of which were after death; one, only, occupied the left parietal bone, and it extended over a great part of the occiput and posterior fontanelle, as in the case reported by Michel; the child got well without any operation. The four others occupied the position indicated by Nægele; one of them was in the wards of M. Honoré, at the *Hôtel Dieu*. I do not know whether the child recovered; I only saw the vault of the dried cranium of the third infant, the bones of which were roughened and manifestly altered. It was M. Cazalis, the *interne* of the hospital, who showed me the specimen. The two last belonged to Valleix, the *interne* at the Foundling Hospital, and scarcely differed, the one from the other. From that which we dissected together, we concluded that a cellular layer remained on the surface of the bone, and that the destruction of this layer about the centre of the deposit did not take place first: it was between the pericranium and this lamina that the deposit took place. Bony granulations appeared in great numbers on the parietal bone, and a circle or real pad of the same nature was seen just at the margin of the separation. There was hypertrophy in place of wasting, caries or necrosis, a peculiarity which, with many others, proves that the periosteum does not play the part which is ascribed to it in the nutrition of bones. These last facts confirm, in great measure, the observations of Nægele, and are contrary to those of Paletta, Hære, and to all those which have been advanced in France regarding the condition of the bones in *cephalæmatome*. It appears to me, also, that the presence of a layer of cellular tissue between the hard structures and the effused liquid has not yet attracted the attention of observers. Not wishing, for a moment, to attach any consequence to this opinion, I confine myself to

mentioning it in passing; I will say, however, that it tends to do away with the difference which seems to exist between the opinion of the learned German professor and mine as to the precise seat of the tumors beneath the pericranium.

I will not conclude without calling to mind that this is only a sketch, and that much more might be said on bloody tumors, if I wished to treat in detail the principal questions which belong to them.

PART II.

MANAGEMENT OF THE LYING-IN WOMAN.

CHAPTER I.

ORDINARY ATTENTIONS.

THE accoucheur, being now satisfied as to the condition of the child and delivery of the after-birth, has nothing further to do except to attend to the woman herself. After ascertaining that the womb is well contracted, and everything in a natural state, he cleanses (or orders it to be done) the vulva, the thighs, and all the parts that have been soiled with blood, waters, or other substances during the labor. Some warm water, either simple or mixed with a little wine, provided the parts are soft and relaxed, is, with the addition of a piece of sponge, all that is necessary in this little operation.

SECT. I.—IMMEDIATE ATTENTIONS.

We next *change* the woman's clothes; the *chemise* may be long, soft, and wide, and either open in front, or not, and it should have long sleeves, so that the arms may not be exposed. Over this chemise there is worn a cotton shirt, and then a neck-handkerchief round the neck, so that the upper part of the breast, which is generally exposed to the air, may be rather better protected than the rest of the body. In summer, and whenever the weather is not cold, these two pieces, together with the head-dress, compose the whole of the woman's dress; otherwise she puts on a long wadded silk-gown open in front all the way down; in this gown, there is the double advantage of being warm, and very light. However, like the dress of the child, that of the mother is a matter which we generally leave to the nurse; and provided the several pieces be sufficiently large, and their number and thickness suited to the temperature of the weather, or the habits of the patient, she should always be allowed to arrange her dress as she pleases. The same may be said as regards the head-dress, except that it would not always be safe to permit the patient, as she sometimes requests, to have her hair cut, or sprinkled with salt.

ART. I.—APPLICATIONS TO THE BREASTS.

The breasts do not require to be supported, or provided with wadded cushions, unless they are very large, and where there is fear of taking cold. The bandage which some women use for the purpose of compressing them, and preserving their shape, produces quite a contrary effect; besides, by impeding the action of the respiratory muscles, it may oppose the return of blood to the thorax, give rise to apoplectic symptoms, as happened to two imprudent women mentioned by Baude-locque, and become the cause of a number of diseases, each worse than the other;

the astringent or repellant cataplasms employed for the same purpose, and to prevent the secretion of milk, deserve the same reprobation. Sheep, or hare skin, with which Avicenna was satisfied, which he applied still steaming over the belly and kidneys, is not recommended by any one at the present day. The same may be said of the placenta steeped in boiling oil and wine, and which, when applied to the abdomen, was, according to Fournier, an excellent remedy.

ART. II.—BELLY-BANDAGE.

I would say as much of the *belly-bandage*, so much blamed by De la Motte, Peu, and Levret, were it used solely for the gratification of a vain coquetry for compressing the womb and preventing the entrance of the air into this organ, as Guillemeau contends; but I think it useful in another way. In this, as in all other things, we must take care not to confound the abuse with the wise and reasonable use of things.

Doubtless, by strangulating the abdomen with a towel, to reduce their size and prevent the formation of scars or inevitable wrinkles, women expose themselves to great dangers, without any chance of obtaining their object; but, as has been advanced by Smellie, Baudelocque, M. Gardien, and Mauriceau, a bandage that is moderately tight, or simply gives a good support, may be of great service, and counteract the formation of many serious diseases. The suddenness with which the womb empties itself causes the abdominal viscera, immediately after delivery, to be all at once relieved from a long-continued state of pressure; the abdominal parietes, as they do not follow up the retreating movement of the uterus, no longer support the digestive organs with the same power; a kind of vacuum is effected in the large vascular trunks, and the blood would be determined there with so much the greater force, as it has only penetrated them with difficulty for some months; hence arises a greater tendency to hemorrhage, inertia of the womb, inflammations and functional disturbances of the liver and intestines. Hence, says Van Swieten, the syncopes that are so frequently met with in women recently delivered, though M. Désormeaux thinks they often depend upon hysteria. Again, Stoll thinks that this is the principal cause of the puerperal peritonitis. Now, the bandage, as I understand it, is intended to supply, as far as possible, the action of the abdominal muscles, to promote the concentric movement of the uterus, and prevent the afflux of blood towards that organ and the engorgement of all the other viscera: besides, it is easy to acquire an idea of its utility, by reflecting upon the dangers that follow the operation of paracentesis, where the surgeon omits the precaution of applying a compressive bandage upon the belly, after the evacuation of the fluid; for as to degree, the pressure upon the parts contained within the abdomen experiences nearly the same transition in a woman delivered of a child as it does in a dropsical patient undergoing the operation of tapping.

It is true that, if not carefully applied, the bandage soon rolls up into the form of a string, and becomes more hurtful than useful; that, as M. Désormeaux remarks, most of those women who neglect to apply it are not evidently worse off on that account, and that the use of it could not have entered into the original plan of the constitution; but as, when placed so as to produce no uneasiness or pain, I cannot perceive how it can do any harm, and as in many cases it is incontestably useful, we should by rejecting it expose ourselves, without any motive, to see symptoms arise which at first it would have been very easy to repress or prevent.

It is composed, first, of a towel folded into a triangular shape, which is placed on the hypogastrium with the point downwards, and then of another napkin, which is folded once or twice lengthwise, and passed round the body like a bandage, embracing the hips. To prevent it from getting into folds, the last napkin

should be supported above by a scapulary on the two ends of a bandage, arranged like suspenders, and below by pinning the ends of her *cloth* to it.

ART. III.—CLOTH TO THE VULVA.

The *cloth*, formed of a piece of fine linen folded three or four times, and sufficiently long to cover the vulva, and go to be pinned to the body-bandage both before and behind, is designed to receive the fluids that are discharged from the vagina, and to prevent the bed-clothes from becoming soiled with them. When care is taken to renew them frequently, and not to pin them too tightly, none of the ill effects will ensue so justly attributed to the old-fashioned *cloth*, of which some women will make use, and which consisted of various tampons kept in the vulva, and which more or less strictly stopped the passage of the vagina. Although it is not an indispensable article of dress, it seems to me that it may safely be permitted as a means of cleanliness to those persons who desire to have it, or who set any particular value upon its use.

ART. IV.—BED FOR THE WOMAN.

The *new bed*, to which the patient is about to be transferred, ought to be furnished with an oil cloth, if one can be had, and with a sheet folded into four layers, or with any other piece of linen fit to protect the mattress. The bed-clothes, the coverlids, and the arrangement of the bolsters do not require any interference on the part of the accoucheur, and ought, like everything else, to be suited to the season and the habits of the woman.

She is to be transferred to the new bed shortly after delivery, and when the vagina is freed from the clots and the fluid blood, which commonly follow the expulsion of the placenta. She is then in a state of agitation, and can without inconvenience bear the little shocks which the transfer almost inevitably occasions. If we wait longer, as some authors have recommended, from fear of hemorrhage or convulsions, she would be in the situation of the traveler, who, having reached his post harassed and fatigued, can still take a few steps while heated, but, when he once becomes still and cooled, is quite unable to walk. All this, however, is to be understood of cases in which everything has passed naturally; for, if the womb should not contract well, or should there have been any flooding or threatening of convulsions, or any other accidents that commonly ensue from a state of extreme weakness, the removal should be deferred for a few minutes in order to allay the danger or give time for the functions to return to their natural condition, while the woman is still upon the bed whereon she had been delivered.

Those who get up, and go without any support to get into the other bed, run the risk of bringing on inversion, *anteversion* or *retroversion*, prolapsion of the uterus, and many other dangerous complaints. They ought to be warned of it, and made to understand that they should allow themselves to be carried; when they are very weak, or any accident has supervened, which might be aggravated or recalled by too much motion, the two beds ought even to be placed side by side, for in this way the woman can be slid on the clean bed without moving her much, by making use of the sheet on which she laid during the labor, and which may be easily removed afterwards.

SECT. II.—SUBSEQUENT ATTENTIONS.

When put to bed, it would be useless, and indeed not always free from danger to compel the patient to preserve an attitude that she is unaccustomed to, to make her bed represent an inclined plane for example descending towards the foot, for

the purpose of favoring the escape of the lochia, or, on the other hand, to keep her hips raised higher than her head, with a view of moderating the fluxion of fluids towards the genital organs; she will lie upon the back, with the legs stretched out and close together, should that position appear more convenient and not fatiguing to her, but she ought not to be prevented from turning on the side, and bending her limbs if she wishes to do so. In all respects, she should be allowed to consult her own ease, and her own inclinations should be attended to. The fatigue and weakness brought on by the constraint of a fixed posture would of themselves be sufficient to bring on some accidents, and constitute a morbid state even in a healthy person subjected to them; and they should, *à fortiori*, be dispensed with in women whose functions, being temporarily disturbed, require so much care and caution for their restoration to a natural state.

ART. I.—HYGIENIC TREATMENT.

All that has been said, in speaking of the management of a woman in labor, relatively to the air which surrounds her, the chamber, and her moral condition, is equally applicable to her during the subsequent confinement. It is important that she should neither speak nor be spoken to, except when necessary. A calm state of the mind and repose of the body are so indispensable that too much care cannot be taken to remove every cause that might interfere with them. The value of this precept was so well understood in ancient Rome that the magistrates themselves had no right to enter the house of a lying-in woman for the execution of any sentence or decision whatever.

After the delivery of the placenta, and putting to bed, the woman is commonly seized with a rigor, which sometimes goes so far as to occasion a rattling of the teeth together. Some physicians and the public have on this account deemed it best to cover her over with a weight of bed-clothes; but this rigor, which is sufficiently accounted for by the changes that have just occurred in her system, and which must not be confounded with the chill of peritonitis, lasts but a few minutes, and scarcely deserves any particular attention.

It would, doubtless, be imprudent to cover the lying-in woman too lightly; but it would be equally dangerous to fall into the opposite excess. By covering her with thick bed-clothes, and surrounding her with well-closed bed-curtains, and, in fine, by keeping her too warm, besides the headaches, floodings, and convulsions to which she would be exposed, we rarely fail to produce a more or less abundant perspiration, which it is sometimes difficult to suppress; this diaphoresis probably has a great deal to do in producing the miliary fever, which is so uncommon at the present day, and which was formerly so often met with in the lying-in room.

§ 1. SLEEP.

Sleep being of the first necessity to a being worn out with fatigue, there would be a sort of cruelty in not permitting the woman to enjoy it. In advising that she should be kept awake for several hours for the purpose of avoiding hemorrhage, De la Motte certainly did not in this morbid phenomenon distinguish the effect from the cause. Dionis, who was obliged to read in the presence of the queen for four hours to prevent her from sleeping, observes that he does not understand the necessity of this method, which was probably that of Clement, and which Saint Germain recommends, like Fournier and several others, with the view of avoiding serious consequences. Although women sometimes do fall asleep with all the appearances of health, and wake up soon afterwards in the midst of a profuse flooding, there is a far greater number who owe their well-being only to the beneficent influence of a refreshing sleep. Besides, these floodings were imminent, or had even begun at the time the women fell asleep;

the desire for sleep being one of the most common symptoms; if they should be unsuspected at first, and the woman yields to the necessity she feels, she in fact falls into a dangerous sleep, and sometimes never awakes from it; but in this case the sleep is the effect, and not the cause of the disease; it is consequently not contra-indicated by anything; only, prudence requires that the pulse should be watched, and that the hand should from time to time be placed on the hypogastrium, to ascertain that the womb has not fallen into a state of inertia.

After this first sleep, that is to say, after the lapse of two or three hours, she should sit up in bed and take a little broth; this position serves to rest her, and allows the lochia which had accumulated in the vagina to flow readily off.

In the following days her linen is shifted accordingly as she gets it soiled; and it would be very wrong, as a general rule, not to change it before ten days, as Levret advises. The external parts of generation should be often washed, and cleansed with mallows water, which may, without inconvenience, be replaced by a decoction of chervil mixed with milk. Constipation, so frequently met with in these cases, is combated by means of mild clysters, without regard to the prejudice which decides that no clyster should be given previously to the occurrence of milk fever. Smarting about the meatus urinarius, difficulty of making water, hemorrhoids, and other effects of the frictions which must be experienced by the bladder and rectum while the fœtus is passing out, require emollient or slightly aromatic lotions, hip-baths, and sometimes the use of the catheter.

§ 2. REGIMEN.

The *regimen*, both alimentary and medicinal, of lying-in women, is a point deserving the whole attention of the accoucheur—not on account of the number or energetic quality of the substances which it is proper to administer, but because there are nowhere else so many vulgar practices to proscribe, so many ridiculous prejudices to extirpate, as upon this subject.

Drink should only be given to satisfy thirst, and not for the mere pleasure of making her swallow ptisan; the woman requires a drink, and not a medicine. In regard to this, her taste and idiosyncrasy may be consulted. She commonly continues to use one of the ptisans which she had been advised to use during her labor. When tired of one, another is given to her, and provided they do not prescribe some of those bitter, exciting infusions, or some active compound, of which the old women are so prodigal, she may in general be allowed to take what pleases her best. Hot wine, aromatics, alcoholic tinctures, coffee, tea, and chocolate are not more admissible after than before her lying-in.

The *food* should be light, and given in small quantity: broth given one, two, or three times a day, or some messes of pottage, are all that prudence will allow before the milk comes to flow freely. Eichèle has supposed that, by abstaining even from the broth, and making use of debilitating measures, the milk fever would be prevented from coming on; but I have often had opportunities of proving the absurdity of such an assertion. If the woman is to suckle her child, it is not improper to allow her to have pottages of a rather more substantial kind the day after the delivery; in the opposite case, I give nothing but broth. Upon this subject, attention must be paid to her state of health, her habits, and constitution. We ought not, for example, obstinately to restrict a majority of country women to too severe a diet, for, although many of them may have fallen victims to the many imprudences they commit, there is a much larger number who, without making any change in their ordinary diet, and continuing to eat outlets, bread, and all sorts of meats, and at times very gross food, yet get up, walk about, and do their customary work, in two days after child-birth, without any bad effects following such a course.

When the secretion of milk has taken place, and nothing unnatural has hap-

pened, she begins to return by degrees to her common mode of living; she passes gradually from soup and panada, and semouilles and rice milk, to boiled eggs, white meats, fried fish, chops, and other common dishes; so that in from eight to ten days the patient has no more need than anybody else of being directed in relation to the choice of her food. The same is true of her drinks; from wine and water she proceeds gradually to the use of beer or pure wine; in fact, the ptisans may be laid aside after the fourth or fifth day. Many women, however, particularly those who cannot or will not suckle, would not think themselves safe were not certain infusions and medicines prescribed for them previous to their resuming their ordinary regimen.

The *canne de Provence*, the *arundo phragmytes*, and the lesser periwinkle, especially enjoy a great reputation in this respect with the public.

The ptisan of *canne* is too insignificant and inoffensive for us not to prescribe it for women who repose any confidence in it. The *arundo phragmytes* is scarcely more active; but, according to M. Désormeaux, the periwinkle injures the stomach, excites the pulse, and ought to be proscribed.

Whether these drinks have been made use of or not, almost all women in child-bed desire to be purged before they get up altogether; they then use sometimes an anti-lactic purge, and at others some one of the ordinary cathartics. Weiss's whey and *sal de duobus* have long enjoyed great vogue among the former; while the latter most generally use manna, or castor oil, Seidlitz water or decoction of senna.

I am aware that it would be dangerous to give such remedies without discrimination to all women, as has heretofore been done; but is it a much wiser course to reject them all, as a great many physicians of the present day recommend to be done?

If the accoucheur fails to order them, he exposes himself to a thousand reproaches, which I am sure are unjust, but which, nevertheless, cause him to lose the confidence of his patients. Should the woman be seized with headache or rheumatism, even ten years after her lying-in, the milk is the cause of it; do any pimples, or efflorescence on the skin, any fever, abscess, or any sort of inflammation make their appearance, it is always owing to the milk; and upon reaching a *certain age*, it is still worse; if the features lose their freshness, if the color of the cheeks and lips fades, if the eyes cease to be brilliant and bright, she is very careful not to accuse the inexorable sway of time, but she refers to the *lait répandu*, and the blame necessarily falls upon the physician who did not drive out that *dreadful milk* at her last confinement!

Such prejudices would doubtless not justify the employment of purgatives, were they so dangerous as some persons choose to say they are, and were they never of any use; but such are not the facts. I have frequently administered them, and can assert that I have never known them to produce any bad consequences; and that, in a great number of cases, they have evidently hastened the re-establishment of the digestive functions. I should be afraid of their action where the tongue is red and lanceolate, or where there are undoubted signs of phlegmasia in the abdomen; I believe them to be of no use where the strength and appetite return fairly and rapidly; but where the tongue is broad, whitish, yellow, or greenish, the mouth bitter and clammy, and there is no appetite, even although there might be present some degree of fever, tension and sensibility of the epigastrium, a gentle purgative I have often found to be followed by the very best effects. I have seen these various symptoms disappear on the succeeding day in most cases, and health be afterwards restored with a degree of promptitude that I had had no reason to hope for. By freeing the intestinal canal of the mucous deposit with which it is pasted over, the purgatives bring it into a state better fitted for the performance of its functions; the abundant secretions which they occasion to take place from the villous surface of the digestive passages,

free the system from substances that could prove hurtful only, and impress upon the other functions a sort of shock by which nature profits.

I prefer the factitious Seidlitz water, or from six or eight drachms to two ounces of castor oil. Their effect is sufficiently certain, and I have not seen them produce as much irritation as most other evacuants.

ART. II.—OF GETTING UP AND GOING TO CHURCH.

The time that a lying-in woman ought to remain in bed is necessarily very variable, and the nine days, the period fixed by the vulgar, or the fourteen days of Levret, can be adopted only as a mean or general term. Five or six days are sometimes sufficient; but if the symphyses should seem to have been somewhat strained, if the womb has a disposition to prolapse or become inverted, or the health appear frail, we ought to wait, and instead of eight or ten days, we should rather require her to lie still for two weeks. In all cases it would be wrong to permit her to return suddenly to her usual exercise, as some practitioners allow their patients to do. The first day she gets up she should remain half an hour upon a sofa, and an hour the next day; the third she may take a few steps and remain out of bed for two or three hours; and during the following days she should consult her strength and the degree of fatigue as the rule for going to bed again. Soon after this, she can go down and take a few turns in the garden or in the yard; but it would be dangerous to go to church on the first occasion of going out. The churches are generally large, cold, and very freely ventilated. In what is called their *churching*, the women should not keep long on the knees; they are sure to be fatigued before they go out, and often contract there the seeds of serious diseases. Real religion does not demand such imprudences. The woman ought to recover some degree of strength before she goes on foot to present herself at the altar; she ought first to have tried her strength at home, and make sure that it will not be injurious to her to go out into the open air.

ART. III.—BAPTISM.

Another custom that the physician ought to watch over is the baptismal repast, if it takes place within the first ten days after child-birth. In this family feast, joy is not forbidden; they laugh and they talk; she desires to hold out with everybody; the father, the mother, the godfather and godmother, the brothers, sisters, uncles, aunts, &c., all talk to her in turn. She only takes a seat at table out of form, to be sure, or, to make more sure of her prudence, she keeps her bed; all the guests forbid her to eat or drink anything; but, in the mean time, they oblige her to take a mouthful of *this* wine, a mouthful of *that*, then taste of *this* dish, and of *that*, so that it too often happens that at the close of the day she finds herself seized with symptoms severe enough to conduct her rapidly to the gates of death. It would be better, therefore, for her not to be present, unless it be beyond the tenth or fifteenth day, and even then she ought to be extremely cautious.

SECT. III.—DIFFERENT PUERPERAL PHENOMENA.

The lochia, the after-pains, and the milk-fever, three of the principal natural phenomena of lying-in, now deserve our particular attention.

ART. I.—THE LOCHIA.

The term *lochia* is given to the substances that escape from the vulva from the moment of the delivery of the secundines until the womb has recovered its normal size and consistence; the accoucheurs distinguish three kinds of them:

the *sanguine*, the *serous*, and the *milky* or *purulent*; or the red, the clear, and the white. The first are observed on the same day with, and on the day after the birth; it is blood nearly pure. The second appear at the end of twenty-four or thirty-six hours, are formed of serum mixed with a variable quantity of blood, and do not last beyond the period of the milk-fever. The third succeed these, and last until the fifteenth, twentieth, or even thirtieth day, and are produced by the suppurative process going on upon the internal surface of the womb. Nothing, however, is more variable than their abundance and duration; the red lochia may cease from the first day and return on the fourth; I have even seen them reappear on the ninth. Sometimes the purulent lochia do not appear at all, and, in other cases, they last so long that it is difficult to distinguish them from a leucorrhœa. This anomaly is, however, very easily to be understood by reflecting for a moment upon the cause of this evacuation.

Although freed from the child and the after-birth, the womb does not immediately recover its size, and the other qualities natural to it. In a case cited by Leroux, it was promptly restored to its natural condition, although the version was not practiced till a half hour before death. It was still as large as the uterus at six months in a woman of whom Aitken speaks, so as to cause the presumption of the existence of a second child. In general, it exceeds a little the size proper to it at the third month of gestation, according to Ingleby. Ashwell found it a foot long in a woman who died of hemorrhage on the eleventh day. In another, it was as large on the fourteenth day as at the moment of delivery, and contained a pint of black fluid blood. The same thing existed, doubtless, in Aitken's case. The natural conditions do not return until the end of five, six, or eight weeks, a period at which the menses reappear for the first time; the womb, indeed, always remains a little larger than it was before the woman became pregnant, and, in general, the more so as gestation is more frequently repeated. During this period an insensible process goes on, by means of which the uterine parietes are disengorged of the substances they had imbibed. These fluids are directed more especially towards the cavity, because in that direction the tissue is less dense, and they find a freer issue. As long as the great uterine vessels are not emptied, blood only flows; at a later period, it is serum combined with the detritus of the ovum and the mucous secretions of the organ. But a real suppurative irritation is soon established, the product of which, analogous in some sort to the non-contagious discharges from the urethra, by mixing with the serosity and mucus furnished by the womb, constitutes the white lochia. Van Swieten says that some women have a lochial discharge only for some hours. Van der Wiel cites a case in which there is no doubt of it. Millot also speaks of a lady who was confined three times without having any. In a patient that came under the observation of M. Bruckmann, they were supplied by a hæmatemesis. Barbaut also says that one of his patients had them only two hours.

The lochia require only cleanliness; upon the access of the milk-fever, they sometimes cease to flow, or, at least, sensibly diminish in quantity; nevertheless, it is not uncommon to see these two phenomena proceeding together without interfering with each other. When they stop either before or after the milk comes, it appears to me to be generally useful to add to the means employed to recall them the injection of emollient or slightly detergent fluids into the uterine cavity. We can see, further, from M. Lesang, the numerous varieties of lochia imagined by Flamant.

ART. II.—AFTER-PAINS.

The *uterine colics*, or *after-pains*, commence soon after the labor is over, and generally cease upon the appearance of the milk-fever, and rarely last longer than the serous lochia; they are more frequent and sharper in proportion as the

labor has been more rapid and easy, and are sometimes strong enough to fatigue the woman considerably; being produced by the efforts of the womb to contract, it is quite natural that they should be stronger and more frequent in women who have had several children than in those who are in their first childbed. In effect, the womb, too rapidly emptied in the first-named case, does not contract soon enough to prevent the formation of clots in its cavity, is obliged to contract for their expulsion as often as they are reproduced, and each one of these contractions gives rise to a pain. In the second, having reacted for a long time upon the ovum, it is too much irritated at the close not to resume rapidly its natural size, and not permit the blood to accumulate within its cavity, and then there will be no clots, no contractions, and no after-pains; thus the presence of clots determines the contractions, and, as was the case during the labor, the contractions occasion the after-pains. I ought, however, to remark that these pains must also vary in respect to their intensity, the constitution of the patient, and the circumstances; being stronger, for example, in nervous and delicate women, when the womb is already sore, and in a state approaching to inflammation, than in those who are in an opposite condition, though, in fact, the contractions are similar in both cases. It is by attending to these particulars that we are enabled without difficulty to explain their great severity in some women, where there is nothing to be expelled from the genital organs, and their mildness in others, where they coincide with the escape of large coagula; and how it happens that, instead of diminishing after the second day, they, on the contrary, continue to augment in some cases until the third and fourth day, &c. Although we cannot refer the after-pains to wind in the bowels, as Mauriceau thought, or to uterine cicatrices, as Dionis wished, nor even to the suppuration of the womb, as Puzos supposes, it would be better to say, with Deleurye, that the uterus, fatigued, can no longer contract itself without pain. We must not deny altogether the influence of these different causes, for they in no wise contradict the theory of Levret.

It is important not to confound them with an incipient metritis or peritonitis; which, however, is a pretty difficult matter where they reach a certain extent of great severity. Having too often neglected making this distinction is the reason why authors differ so much on the subject of puerperal peritonitis, and the treatment adapted to it; as long as the after-pains are clearly intermittent, and during their intervals, the belly is not sore; while there is no fever, and they have not been ushered in with a chill, there is nothing to fear and nothing to do; they are frequently followed by a pretty severely painful sensation at the hypogastrium, acceleration of the pulse, thirst, and heat of the skin, and, notwithstanding, are not followed by any serious complaints. But we must in such cases pay attention to them, and not forget that they may be the first symptom of a mortal disease.

When moderate, they may be trusted to the resources of the economy, or we may give one or two cups of a weak infusion of chamomile, which rarely fails to make them disappear in the course of two or three days. It would be ridiculous to wish to calm them by giving the woman a few drops of blood from the placenta, as was done in the time of Mauriceau. The two injections a day, which Portal congratulates himself on using, may be useful, and should be preferred to the Epsom salts given for many days in small doses by Levret. Otherwise, it is sometimes useful to prescribe a hip bath, and emollient or slightly narcotic injections; to exhibit sedatives or antispasmodics internally, or to bleed the patient once or twice, either from a vein or by topical means, while at the same time the hypogastrium is covered with cataplasms, and this according as the woman is weak, nervous, or plethoric. It may be necessary even to introduce one or two of the fingers towards the os uteri for the purpose of assisting in the expulsion of a clot that may adhere too strongly. If the after-pains are too severe, we

may also, as directed by Crozat, who says that he has obtained excellent effects, and as I myself have done with equally advantageous, though less constant results, have recourse to ergot, and give during the twenty-four hours in spoonful doses, the oxytocic potion, which I directed when speaking of the suspension of pains; but the great majority of cases require nothing. If, however, they become permanent and are followed by reaction, so as to induce any alarm, mercurial ointment, mixed with a drachm of extract of opium to the ounce, applied in large quantities over the hypogastrium, is one of the best remedies. The use which I have made of this application in peritonitis and in confirmed metritis authorizes me to recommend it highly whenever the uterine pains are prolonged, and indicate an incipient inflammation.

ART. III.—MILK FEVER.

The *milk fever* generally appears on the third day, sometimes on the first or second, or not until the fourth, fifth, or sixth day; I have seen it not come on until the eighth, in a young woman at the Hospital of the Faculty. Headache, *without chills*, heat and dryness of the skin, are its common precursors; the pulse, which is at first small and hard, is soon developed; the breasts grow hard, swelled, and so painful in the course of a few hours as to interfere with the motions of the arms and chest; first a moisture, and then a sweat succeed this stage; the pain in the head ceases; the fever abates in the course of six, eight, ten, twelve, or twenty-four hours, and the reaction which produces the milky secretion is completed; but the breasts remain swelled and painful much beyond this period, especially in women who do not give suck.

While the fever continues, no broths, nor pottages, nor heating drinks should be given. Should it be too high, an attempt to moderate its violence should be made by means of a small bleeding. But in general it requires only the hygienic treatment pointed out above. The coming of the milk is pretty often preceded with the suspension, or at least a sensible diminution, of the lochial discharges, which soon return to their natural course. Sometimes these two phenomena seem to have no influence upon each other; the lochia do not appear again at all after the milk fever has gone off. Nægele says that the secretion of milk is established without any trouble, whenever the mother gives the child the breast two or three hours after the delivery of the placenta. If, on the contrary, she puts it off much longer, the breasts become filled beyond measure, are swollen and painfully distended, and there occurs an accession of fever known as the "milk fever."

CHAPTER II.

THE SEQUENTS OF DIFFICULT LABOR.

SÉCT. I.—DISPLACEMENT OF THE UTERUS.

ART. I.—INVERSION OF THE WOMB.

INVERSION of the womb during labor has often been observed, and it may even take place before pregnancy, as Diemberöck has already proved, and as I have observed also in a single instance. Viardel, who gives a plate showing its reduction, envelops it in a piece of rag, and pushes it up with the fingers. As Baudelocque says, it is more likely to be produced by a short cord than by the weight of the placenta, to which it is ascribed by Sabatier. Immoderate traction on the cord is often the cause of it, as in the cases of Mauriceau, Amand, &c. It may also occur when the woman is delivered standing up, as is shown by Canole's case; Van der Wiel met with it during the delivery of the placenta. When sudden and complete, death may take place immediately, as in the cases of Amand, Vaccoussin, Canole, and Delmas. Two patients, of whom Barbaut speaks, died on the bed; and of seven cases which Hamilton saw, six died before any assistance could be rendered. Most frequently it is incomplete. Mauriceau, Amand, and Levret have seen it as *un cul de lampe* in the upper portion of the vagina; and Leroux gives a similar case. The same thing occurred to a woman about whom Leroy had a violent controversy, and also to a patient of Saucerotte.

Complete or partial *inversion* of the womb is recognized by the reddish or livid tumor which projects into the vagina or vulva, by the absence of the uterine globe above the pubis, and by the pains and syncope experienced by the woman, &c. Although none but the grossest ignorance could confound an inversion of the womb with a polypus in that organ, yet men are sometimes seen, even at Paris, to commit this mistake, even though they are clothed with the title of physicians. A woman, whose labor was quick, but from whom the placenta was removed by force, was taken with inversion of the uterus on the eighth day, in consequence of a difficult defecation: it was reduced, but again recurred, and she was carried into a hospital where the operation for excision of a polypus was commenced, and the mistake was only found out after the application of the forceps of Museux; metritis followed, and the patient died.

Haste should be made to reduce the displaced organ. For this purpose the woman should be so placed that her hips may be higher than her breast; then the hand being furnished with a piece of fine linen spread with cerate, the external tumor should be compressed gradually and without shocks,* and in a steady

* This is the direction given by almost all the authors.—It is not good to compress the womb; such an action only excites the contractions or after-pains, which may as well take place in an inverted womb as in one not inverted—the womb ought not to be handled; by watching it carefully, at the moment when most free from contraction, the fundus may be pressed with the point of a finger, and indented like the bottom of a bottle; when that much is effected, the complete reposition is sure, if only a continual pressure be made, the fundus will be pushed up again through the os uteri and vagina, until the hand is found to be high up in the belly, and contained within the cavity of the reposit organ.—M.

manner, and at all points, pushing it up along the axis of the strait until it has regained its natural situation.

To reduce it before the placenta is detached, as Denman advises, is a bad practice. The galvanic shocks, proposed by Baudelocque, can only be useful after the employment of all other means. Reduction was impossible in Leroy's case, and in the two given by Levret. Hoin and Leroux also failed in 1771, but the affection was of a year's standing. Barbaut speaks of a woman who suffered little inconvenience whilst in this condition. Dewees states that he caused horrible pain without success to a patient who afterwards died; in another case, he was obliged to complete the inversion, after which he succeeded easily. In two others, incomplete inversion taking the appearance of the bottom of a bottle, and which caused great pain, was reduced without great difficulty; indeed, the reduction is generally easiest when the uterus is entirely inverted. The *cul de lampe* often becomes strangulated by the os uteri, as De la Tourette says. If a fold of the intestine becomes retained in it, it causes usually pain and very severe accidents.

If the reduction is absolutely impossible, we should wait and treat the distressing symptoms, and not decide on the ligature or removal of the tumor, unless as a dernier resort, although it was made use of in Bardol's case, in many of those which Baudelocque mentions, in those of Petit, and in that of Newnham, &c. In complete inversion, the method of Viardel, adopted by Leroux, is still the best, which is nearly the same as that followed in the treatment of cows in Poitou, where Leblanc says that he has met with more than two hundred examples. The cloth, which is applied over the surface of the tumor, prevents it from projecting on either side when pushed upon; gradual compression around the edges should also be tried if it cannot be reduced immediately.

It may be remarked, moreover, that inversion of the uterus does not always take place during the delivery of the child or placenta. In the case related in the *Gazette*, it took place on the eighth day; in that of Ané, on the twelfth; and in that of Tealier, on the tenth, and while at stool.

ART. II.—SIMPLE DISPLACEMENTS OF THE WOMB.

The *descent of the womb*, which is pretty often met with in the early periods of a confinement in women who have a very large pelvis, relaxed tissues, a lacerated perineum, or in those who make improper exertions, scarcely requires anything after the reduction except rest and a horizontal posture; it is allowable only to add some astringent or styptic lotions, the use of small rags moistened with red wine, for example, in cases where there is no irritation. Pessaries cannot be made use of until a much later period.

The *anteflexion* and *retroflexion*, that is to say, the state in which the womb bends like an elbow at right angles, so that its fundus comes to rest upon the sacro-vertebral angle or behind the pubis, a disease very well described by M. Ameline in his dissertation, and an instance of which in the dead body was shown to me by M. Comte, would be recognized by the same symptoms as the anteversion and retroversion, and would require nearly the same kind of treatment.

Retroflexion of the uterus, which is infinitely more common than is supposed from the silence of authors, often becomes a grave accident. In this position the organ, which soon becomes the seat of a chronic inflammation, contracts adhesions which render relief impossible. I have already observed fifteen cases of this affection as the sequent of labor, one of which died, after fifteen years' suffering, of an attack of constipation, which could not be relieved. It is, then, a subject which should be more fully studied, and to which Montault has, with good reason, called the attention of practitioners.

SECT. II.—DIFFERENT LACERATIONS.

Many varieties may occur during labor; such as those of the neck of the uterus, of the vagina, of the perineum, of the vulva, and of the sacro-coccygeal articulations.

ART. I.—ELONGATION AND LACERATION OF THE NECK OF THE UTERUS.

In certain women, the *os tincæ*, and all the free portion of the neck of the uterus, become elongated during labor, and so spread over the part of the child which descends first, that it forms a kind of cap, with the border projecting many inches. It is also shown by experience, as Stoltz has besides well remarked, that, immediately after the escape of the child, the neck of the uterus remains large and soft in its vaginal portion, while, on the contrary, it promptly contracts above, so that the hand, which at first penetrates without any difficulty, meets with a certain resistance in entering into the womb; from which it may result that a conception which takes place too soon after labor is a real cause of abortion, as Busch judiciously remarks. The anterior lip is especially liable to assume this condition, and sometimes is swollen in the form of a pad, and, in this thickened condition, descends to the vulva, and may be torn by the head in passing through the excavation; and which a midwife tore into many shreds, mistaking it for the placenta, and which would alarm any one not aware of its origin. Women in their first labors are more subject to it than others. This disposition was mentioned by Portal, and Deleurye noted it, when he said that the neck was sometimes elongated even to the vulva; Burns also pointed it out, when he said that the anterior lip of this orifice projected many inches, and that it should be pushed up with the finger; but no one has described it with so much care as De la Tourette. Ducros has published three cases, and I have also met with it three times, especially in a case in which the child was delivered by the breech.

If we are fearful of this laceration at the commencement, perhaps it would be well to support the *os uteri*, during each contraction, with the extremity of the fingers, as the surgeon of Marseilles directs; but, otherwise, this precaution is at least useless, if not dangerous. The shreds of the flaps soon retract, and become reduced to simple tubercles, which may be easily excised if cicatrization is slow in taking place; if there is no solution of continuity, it disappears in a few days, the woman suffering no inconvenience, and is then an accident of little importance. As to the rents in the *os uteri*, properly speaking, although at first large and deep, and although generally indisposed to cicatrize, they are soon reduced to too small a matter to require any special treatment. In fine, it is almost always, as Stoltz says, the part of the opening which corresponds to the passage of the occiput when the top of the head presents, of the forehead or vertex when the face, and also of the occiput and forehead when the pelvis presents, which is found to be lacerated after labor.

ART. II.—LACERATIONS OF THE VAGINA.

Not wishing to return here to utero-vaginal ruptures, I will only speak of the perforations which serve as a starting-point for vesico-vaginal and recto-vaginal fistulas.

These solutions of continuity which occur in the inferior half of the vagina, appear to me to be produced in three different ways: first, by the uterine contractions while pulling the neck towards the fundus; secondly, by the pressure of the head, either before or behind, during its descent; thirdly, by the contusions due to the same movement; or, indeed, to any obstetrical manipulation.

The first, which are ordinarily the largest, occupy, almost always, the recto-vaginal septum; the second occupy the same situation, and are also of considerable size; the third, on the contrary, occur more frequently in front, in consequence of the head pressing more firmly against the symphysis pubis than against the sacrum. The size, or the projecting parts of the child, narrowness or deformity of the pelvis, bony points and tumors of every kind which may be on the inner side of the excavation, bands, cicatrices, or a coarctation of the vagina and vulva, form the principal predisposing causes. The head, retained for a long time in the cavity, its rapid descent from the superior strait towards the floor of the pelvis, the too violent efforts to which some women yield, and the rigidity of the soft parts in women who are in labor for the first time, are also its evident causes.

Those which result from awkward manipulations are generally higher up than the others: in front, they extend to the bas-fond of the bladder, and not into the urethra; and behind, they open into the sac between the rectum and vagina, and not into the intestine itself, so that a loop of the ilium may slip into the rent, as the cases of Roux and Casamayor prove. Lower down, they are principally produced by the passage of the head of the child in consequence of the change in the direction of the pelvic canal, and because the urethra, enclosed in the anterior wall of the vagina, forms a harder and thicker cord than is generally supposed, reaching the top of the sub-pubic arch, at the same time that the rectum ceases to be supported by the coccyx; here their production seems favored by the number and volume of the wrinkles in the vagina, as they often result from contusions, abrasions, and bruises, or scars, rather than a real perforation of the walls of the vagina, and their existence is often not recognized for many days or even weeks after delivery.

A. *Vesico-Vaginal Perforations.*—Vesico-vaginal fistulæ are too easily recognized to render it necessary that I should enumerate the symptoms here. The passage of the urine by the vagina, the employment of the sound, of the speculum, and of the finger, suffice to prevent all error on this subject. These fistulæ are not unfrequent. If Clarke has met with but four examples in ten thousand women in Dublin, Ryan has met with ten cases, and seven have come under my observation.

Nothing is more difficult than to close such openings, though a great number of them terminate by spontaneous cure.

When vesico-vaginal fistulæ are small, says Mauriceau, they disappear in six weeks or two months; the large, on the contrary, are incurable.

Peu speaks of a large fistula of this kind, following gangrene of the vagina, which cicatrized so as to cause retention of urine; it was necessary to place the patient on her abdomen to sound her, but she was finally cured.

Blundell cites also an example of a vesico-vaginal, and one of a recto-vaginal fistula, which terminated favorably.

In a case of which Ryan speaks, the two fistulæ, recto-vaginal and vesico-vaginal, were *enormous*; eventually, adhering bands were formed in the situation of the hymen, and an almost complete recovery took place, brought about by position upon the abdomen, and simple oiled tampons in the vagina. To prove that it is possible for this sort of fistula to close spontaneously, Ryan reports the following note of a case of a patient twenty years old, small stature, good health, three days in labor, vesico- and recto-vaginal fistulæ. Conquest considered the operation imperatively demanded; Earle and Lawrence asserted that it was impracticable. The vulvar orifice of the vagina was too small; Salmon promised the closure of the rectal opening. Ryan saw the patient; the vulva was like that of a virgin. A fibrous band in place of the hymen; a fistula of an inch and a half in length, three lines in breadth, position, oiled tampon; the coarctation increased, vagina and fistula nearly closed. In a case in which there was a slough as large

as a crown piece, the woman recovered without an operation. There was, at the Western Hospital, a woman suffering under one of these fistulas of fifteen years' standing, observed by Drs. D. Davis and Ramsbotham. She admitted the introduction of all the fingers at first, but the extremity of the index finger would not enter when Ryan examined her. I can also bear witness, in 1831, of the spontaneous cure of a urethro-vaginal fistula, in a woman whose pelvis was much narrowed, and whose deliveries had always been very difficult, even requiring the use of the forceps.

In fine, Deleurye remarks, as Levret had done before, that, if vesico-vaginal fistulæ, or those of the bas-fond, are incurable, it is not the same with those which simply involve the urethra.

I will add that, besides the successful cases which I have detailed, there are also many others on record; one may be found in the *American Medical Recorder* for 1826, in which the continued suture was used with complete success. Ho-bard succeeded by combining the use of nitrate of silver with the suture. Chranam gives a case which was cured by the suture; and Ryan says that S. Cooper was not less fortunate in the treatment of a case at the Middlesex Hospital, by keeping a catheter in the bladder, a tampon in the vagina, and the patient constantly on her belly or side. McDowel and Baravero succeeded with caustic, although it had failed in Earle's hands. I will say, moreover, that in some cases the bladder unites with the vagina, and the external opening may become closed up. When such is the case, the urine and menses will be retained, and will give rise to great suffering and even convulsions. In similar cases, calculi may become lodged in the vagina. New instruments have been devised by Colombat, Récamier, &c., for the sure and easy application of the suture in vesico-vaginal fistulæ; but, as they have not been tried, I do not think it worth while to describe them. In fine, if the fistula does not extend beyond the urethra, it is better to use the catheter frequently than to allow it to remain permanently in the bladder.

If the affection proves incurable, the gum-elastic bottle recommended by Guillon, Holmes, and Earle, with a catheter fixed in the bladder, will be found, as a palliative means, infinitely preferable to the kind of bladder proposed by Dugès.

I have thought for some time of an operation, but have not had an opportunity of testing it, which is to cauterize the fistula and the opposite wall of the vagina deeply, or to cause an active inflammation by any other means, and then to keep the edges in contact by distending the rectum with some foreign substance. After the fistula has been closed by the adhesion of the walls of the vagina, it would be possible to open the canal again, should the woman desire it. I think that this process would be preferable to that of Vidal de Cassis, which consists in a closure of the vulva itself; but it would require a number of cases to establish its value.

The method which I devised for the cure of fistula *atrifères*, and which I proposed in 1832 to apply to urinary fistulæ, has been employed by Jobert, but we do not know with what success. I will add, with Larrey, that a great number of cases of vesico-vaginal fistula published as cured, have not been so in reality. That which was given by Lallemande, that of Philippe of Rheims, that of Vidal, and the first which was operated on at Saint-Louis, towards the end of the summer of 1834, were none of them successful, though published as such. Whether the women are themselves deceived, or whether they wish to deceive, they say that they are cured, and the surgeon is imposed on with the greatest ease.

B. Recto-Vaginal Perforations.—Recto-vaginal fistulæ present also examples of spontaneous cure. Fichet de Fléchy gives one which seems authentic, and a second is given by Sedillot. Deschamps says that he saw a case get well spontaneously in a woman sixty-eight years old, at the Salpêtrière, in 1833. Capuron

communicated another to the Academy, and I recollect one mentioned by Philippe de Mortagne. Levret pretends that he has often seen them cured by the descent of the womb; and Deleurye, who agrees with Levret, says that he has cured them with the suture, by depression of the neck of the womb, and by placing a large canula in the rectum. In a case in which different operations had been tried, J. Nicols succeeded with the suture, which had also been used by Saucerotte and Noel. Compression and pressure on the perineum, employed in one case by Duparcque with success, act nearly in the same way as the plan of Levret and Deleurye. Compression with covered metallic plates, when one is introduced into the rectum and the other into the vagina, and fixed with a screw, is a bad method, although it is said to have been used with success at Cullerier.

ART. III.—RUPTURE OF THE PERINEUM.

In common language, ruptures of the perineum are improperly confounded with lacerations of the vulva. These are only, ordinarily, slits which are more or less extensive from before backwards, or on the side of the perineum; the others are real perforations, leaving the edges of the vulva and anus intact. To make as little alteration as possible, I will speak of the first as ruptures of the vulva and perineum; and for the other I will use the term perforation, as Moreau does.

§ 1. PERFORATION.

A. Rupture of the central portion of the perineum, first observed in a mare belonging to the Queen of England, by Harvey; afterwards by Bianchi in a woman whose vulva was diseased; then by Violet, who relates a case, has become in France, since 1829, the subject of much controversy. As many of the cases reported are wanting in circumstantial details, and as, according to the opinion which he expressed on the mechanism of labor, this perforation is impossible, M. Capuron maintained, and still maintains, that its occurrence has not been proved to such an extent as to allow the fœtus to escape through it in place of through the vulva. It seems indeed difficult, at first, to believe that the perineum which, in its natural state, is only from an inch to an inch and a half in extent, should, by rupturing, furnish an opening large enough to allow the head and shoulders of a child to pass, without involving the sphincter of the anus, or vulva; but on a little reflection it will be seen, on the contrary, that it is easy enough. Every accoucheur is aware that, near the close of labor, the perineum, pushed out, thinned, and distended by the head or breech, acquires a length of three or four inches, so that the head may be almost entirely contained in it. Now, if the laceration takes place at this time, in the part which is most distended, in a moment the expansion may be transformed into a circle capable of being enlarged to the same extent which the perineum occupied previous to the laceration. Why should not a hole in the middle of the perineum afford a passage to the head, just as well as the anus, or even the vulva, which is only developed at the expense of these same soft parts? Far from being impossible, the escape of the child through it is easy enough, as the circumference of the opening increases by the extensibility of the neighboring parts, and by the easy prolongation of the rent in every direction; while by the natural passages the resistance is necessarily much greater.

Capuron has no reason for his opinion, if taken literally, when he says that the laceration, which will permit the escape of the child, is not strictly central. In such a case, indeed, the slit extends, almost always, either forwards, or to one side, or backwards, and sometimes even in all three directions at a time; but this difference is nothing more than a mere refinement, which is scarcely worth discussing.

Capuron objects that the central rupture of the perineum has not been seen

after labor by most of the persons who have described it, and that it will be necessary, to remove all doubts on the subject, that an instructed accoucheur, and one worthy of belief, should himself bear witness to the passage of the child through this opening. I will reply that his argument is not well founded, inasmuch as a large perforation of the perineum which communicated with the vagina has been met with, through which the cord passed, and by which it was removed, which, therefore, authorizes us to say that the delivery took place in that way; for, after the perineum is once pierced or ruptured by the head, I do not know how Capuron, even, could deliver the fœtus by the vulva. On the other hand, we, at the present day, possess well-authenticated facts proving the occurrence of this rupture under the observation of men very capable of understanding it; I can, myself, add an example to those which are already recorded.

Madame B—, living at the time in Rue Voltaire, had been in labor since the day before, when I was called to her the 24th of June, 1825, at five o'clock in the morning; she was large and strong, and it was her first pregnancy. The pains, which had been moderate from six o'clock until midnight, were intense about two o'clock, at which time the head became engaged in the excavation. The midwife, seeing that there was danger of the child's escaping through the anus, endeavored, for an hour, to push it back towards the vulva, supporting the perineum with all her force; the rupture, however, took place, and, when I arrived, so soon as the midwife and nurse removed their hands, I saw that the whole of the vertex had already cleared the perineal opening in the first position; the remainder of the head soon escaped, as also the whole of the body, and the child proved to be a large, strong, and lively boy. As the vulva was small, I left the cord in the accidental opening, through which the placenta was afterwards delivered.

Before the head had passed out, we supposed that it would escape by the anus, as the commissure of the vulva preserved its thickness so well; but when the parts had contracted a little on themselves after labor, we were convinced, both by the touch and sight, that the sphincter ani had not suffered at all; the rent, which was unequal and fringed, and a little concave posteriorly, extended more on the left side than on the right, and was rather nearer the anus than the vulva.

I only prescribed rest and position on the side, injections, and lotions, with the decoction of marshmallows. There was no dressing applied, and on the eighteenth day, the wound had completely cicatrized.

Madame B—, becoming pregnant some months afterwards, was, in the following year, delivered *per vias naturales* without any accident, and without assistance; as the child came away whilst the husband came for me from Villette, where she was staying at the time.

M. Coster has since communicated to me a similar case. The woman was twenty-three years of age; the child, which was of middle size, traversed quickly the perineum, in consequence of a violent contraction; a band, the thickness of the finger, was between the rupture and the vulva; the placenta was expelled directly through this perforation, and the vulvar band was afterwards destroyed by suppuration.

B. Coutouly, Evrat, and Jobert also saw the children pass through the perineum, in the cases which they published. If Nedeý, Denman, Champenois, P. Guersent, Francon, and some others, were not able to verify the fact at the very moment of delivery, or if they failed to obtain some details on this point, it is not the less impossible to deny the exactitude of their observations. Besides, we are, at this day, acquainted with a sufficient number of other examples. Thiébauld has observed it in a woman affected with an eversion of the bladder. Meckel saw it in a case in 1811, and Merriman in another in 1816. Different facts were published regarding it, in 1822, by Douglas; since by Frank, by

Master in 1823, by Gravis and Lebrun, by Moschner, by Jungueman, Blundell, Ryan, Dupuy, Hernu, and Duparcque. Trinchinetti cites, also, two observations, which make a total of about thirty cases instead of seven, which Moreau at first found. The passage of the child through the perineum, without rupture of the anus and of the vulva, is then actually a settled question, and upon which there can no longer be any discussion.

C. The *causes* of this accident have been very well explained by Moreau. They are chiefly the too great projection of the sacro-vertebral angle, a great inclination of the abdominal strait, a want of curvature of the sacrum, a want of solidification of the articulation of the coccyx, too great size of the inferior strait, especially behind, a contraction of the pubic arch and excessive depth of the symphysis pubis, natural contraction of the vulva, as in women with their first children, an unnatural rigidity and length of perineum, an absence of curvature of the whole pelvis, violent efforts of the woman, or a too rapid descent of the head, occipito-posterior positions, and even the presence of an arm or foot, as in the case of Dupuy; in a word, anything which prevents the occiput from occupying the axis of the vulva, or which forces it to follow that of the superior strait until towards the close of labor.

We may fear rupture of the perineum, when the head, which has already passed from the bones, pushes it down considerably without its becoming thin at its anterior edge; when, projecting in front, it folds on itself and shortens the vulva instead of elongating and extending it; in fine, whenever we meet with or recognize any of the causes mentioned above. Its existence alone is enough to establish the diagnosis, and it is, consequently, useless to inquire into its signs.

D. *Prognosis*.—It is not a dangerous accident. If one of the women mentioned by Trinchinetti died, it was because grave complications accompanied the rupture of the perineum. The patients recover almost always very quickly, and suffer no inconvenience in their subsequent labors.

E. *Treatment*.—Injections to keep the intestines empty, injections into the vagina, emollient lotions and hip-baths, approximation and immobility of the thighs to favor the agglutination of the lips of the womb, and a mild and moderate regimen, constitute the most judicious treatment. We should not cut the anterior band, as Champenois did, unless it is very thin, or unless it has lost entirely its disposition to draw itself back. Should this be done, there would be nothing more than a simple slit to treat, which will be spoken of in the following article. Its cure by means of ointments, injections, or slight cauterizations, refreshing the edges by means of the knife and the suture, would be useless, and should not be tried unless the time of spontaneous cure has passed, unless there is incontinence of fecal matter, or such a considerable destruction of the parts that cicatrization cannot take place without assistance.

§ 2. LACERATION OF THE VULVA.

Lacerations of the vulva, involving only the fourchette, or which extend but three or four lines into the perineum, are of too little importance to require any attention. Those reaching the greater labia, and which are transverse, as I have seen in three or four cases, a little in front and to one side of the posterior commissure, scarcely deserve more notice. In saying that the clitoris is often detached or contused by the head during labor, Peu, who was severely criticized on this point by De La Motte, probably mistook it for the lesser labia, which are indeed subject to this kind of injury. If they do not contract or cicatrize in a suitable manner, it will be very easy to excise the flaps, as it can never be followed by great inconvenience.

The deeper slits of the commissure, and especially those which reach the neighborhood of the anus, and, with still greater reason, those which involve the

sphincter, so that the vagina and intestine are thrown into one, demand, on the contrary, every attention of the surgeon.

This accident seems to have been noted for the first time in a little work of Eros. Levret remarks that the *fourchette* is more frequently torn on one side than in the median line. I have also seen that the rupture is frequently multiple, and that the natural retraction of these little flaps sometimes gives rise to bands or tubercles which may be mistaken for syphilitic vegetations.

A. *Causes*.—The occipito-posterior positions, those of the face and of the breech, as indicated by Levret, are not its only causes. It may sometimes follow presentations of the head, or of the feet, elbow or knee, when badly directed. A shoulder, and improper manipulations, known under the name of *little labor*, may also produce it, as we see by a statement of Peu. The infiltration and rigidity of the greater labia also favor it much; and there is nothing extraordinary, in this point of view, in the fact mentioned by Burton. The practitioner should be especially careful during the passage of the point of the posterior shoulder in the presentation of the vertex, when the fœtus is quickly expelled.

B. *Prognosis*.—The inconvenience of an extensive laceration of the perineum may constitute a disgusting infirmity, and may render life a burthen. If the inferior extremity of the recto-vaginal septum is involved, the fecal matters, which often cannot be retained, transform the vagina into a real *cloaque*, and place the woman in nearly the same condition as those afflicted with artificial anus. The absence of the floor of the excavation renders the womb exceedingly liable to prolapsus, and it is almost impossible to retain it in place with a pessary. Without being impossible, fecundation is less likely to take place; although Morlanne speaks of a woman who became twice pregnant while in this state, and I have met with another in her fourth pregnancy in 1828. We cannot hope for great advantage from the accident in subsequent labors, for, as De La Motte proves, it is generally the bony strait, and not the perineum or other soft parts which offer resistance to the passage of the child.

C. *Spontaneous Cure*.—If, notwithstanding the troubles which follow them, extensive lacerations of the perineum are most frequently abandoned to the resources of the organism, it is because cure, either complete or incomplete, is not uncommon; and because, on the other hand, the artificial means employed have not always been followed by the anticipated success. Thymœus says that a woman, whose perineum was lacerated throughout, recovered without any treatment; and Peu states also that a poor woman, who had been very badly managed by a midwife during a difficult labor, and who had the perineum so much torn that she could not retain the injections, or her feces, also recovered perfectly; but it must be added that De La Motte, who pretends that he saw her thirty years afterwards in Normandy, insists upon it that she was not, by any means, cured. In speaking of the suture, Mauriceau confines himself to recommending such women to have no more children. Deleurye says, in the most confident manner, that these large solutions of continuity get well without the suture. "Laceration of the perineum down to the anus is an unfortunate accident," says Puzos, "and one with which I have sometimes met, but, by keeping the limbs together with a bandage, it recovers just as well as with the suture." Aitken says the same thing, and maintains that the suture is never admissible, an axiom which D'Outrepoint has revived, and which many practitioners have adopted. We therefore cannot say, with M. Roux, that we have never seen any "reunion take place by the natural means alone." It was, on the contrary, so complete in a case mentioned by Trinchinetti, that it was afterwards necessary to incise it, and to dilate the opening into the vagina, to allow copulation to take place.

D. *Suture*.—Notwithstanding that it is rejected by many authorities, the suture, often tried without success, and even at the present day by MM. Dubois, father and son, in two different cases, and by another practitioner whom Blundell

mentions, has frequently succeeded. Guillemeau, who thus treated a laceration which extended to the anus, used the twisted suture, and the woman recovered in fifteen days. De La Motte, who regards the suture as indispensable, introduced three points in one case—one in the recto-vaginal septum, another in the perineum near the anus, and another in the neighborhood of the fourchette—and succeeded without any difficulty. Morlanne, Saucerotte, and Noel have each been successful in using it. Montain used the suture a month after delivery, and recovery took place in eight days. Osiander cured his patient with the simple suture, as did Dupuytren, whose operation was not published until lately. Rowley succeeded, in the presence of Blundell; and also Dieffenbach, who attributes his two successful cases to the lateral incision which he took care to make on each side. So that the science possessed at least ten examples, without counting those which Meissner borrows from Churchill, Bond, Alcock, and Zang, when Roux again called attention to this point. In cases of rupture of the perineum, Busch extols especially the method of Dieffenbach, which consists in making an elliptical incision on each side of the suture. A laceration of the recto-vaginal septum was cured by Laugier, as in Saucerotte's case, by means of the suture. Without believing that the twisted suture is the only one which should be employed, I think, however, with Roux, that it offers the most advantage, and deserves preference whenever no special indication opposes its employment. This surgeon succeeded in four out of five cases; the last patient died in consequence of the operation; but this woman, whose affection dated from an anterior parturition, and from syphilitic ulcerations, had, fifteen months before, appeared to me to have been too badly treated to submit to an operation, when she came under my care for the excision of a simple band across the rectum, and not for fistula in ano, as M. Roux states from false information. (See *Médecine Opératoire*.)

§ 3. LUXATION OF THE COCCYX.

Among women who do not become pregnant until after the thirtieth or fortieth year, the coccyx, the articulation of which has had time to solidify, may be broken, or sometimes luxated with a considerable snap, as the head passes the inferior strait. It is an accident which Denman has met with, and which Ryan looks upon as occurring frequently. At other times, the bone is neither luxated nor fractured, but the articulation is so violently strained that some pain, inflammation, whether acute or chronic, suppuration, caries, and necrosis may follow, just as when other articulations are violently twisted. Ryan saw it so entirely separated from the sacrum that it ultimately came away. Burns states that, when the luxation is not reduced, it is followed by abscess, which usually opens into the rectum. Dewees, who lays much stress on the consequences of violence to this articulation during labor, says that the pains are sometimes very acute, and can only be relieved by camphor in large doses, opium, and oil of juniper.

Fracture, dislocation, or twisting of the coccyx, seldom presents any great difficulty in diagnosis. The displacement, the mobility of the bone, the pains which the woman feels, which are increased by the least pressure, or by efforts at stool, constitute the principal signs. Emollient injections, anodynes internally, or even locally, leeches and cataplasms, if there is evident inflammation; resolvent applications, liniments, anodyne and slightly exciting ointments, if the danger of suppuration seems to have passed; incision through the skin, or into the rectum, to give escape to pus, effused fluid, and bits of loose bone, constitute the different remedies to be used, each being adapted to the special indications.

What I have here said applies equally well to the majority of the other articulations of the bones of the pelvis, and it is not necessary to dwell on them longer.

ART. IV.—CEDEMA OF THE VULVA.

Infiltration of the external genitals may go to the extent of closing the passage of the vulva, and, consequently, of preventing the discharge of the lochia. If the swelling be purely lymphatic, and not painful, it will disappear upon making a few pretty deep punctures upon the internal surface of the pudendum. Where there is sensibility and any signs of inflammation, recourse should be had to baths, embrocations, emollient cataplasms, and even to leeches, if the case require it. In fine, abscesses which are sometimes met with, and of which Fichet de Fléchy reports two cases, should be treated on the same principles as those which occur in other parts of the body, and should be opened freely and in good time.

ART. V.—THE USUAL SEQUELÆ OF LABOR.

Rubbing, pressure, and violence of different kinds, which the pelvic viscera are exposed to during labor, render the patient subject to retention or incontinence of urine, and to hemorrhoids and constipation.

§ 1. AFFECTIONS OF THE BLADDER.

A. *Retention of urine* should be watched, unless the woman complains of it from the commencement. The catheter is its proper remedy, which should be introduced two or three times a day, and the same means to be used in the following diseases may prove serviceable as accessories.

B. *Incontinence of urine* requires the use of emollients. Usually, this cure takes place without difficulty. If it is slow in taking place, it may be hastened by keeping the bowels empty by purgation, and especially by applying fly blisters over the hypogastrium.

§ 2. AFFECTIONS OF THE RECTUM.

A. *Constipation*, the natural consequence of the sluggish condition of the rectum, and of the irritation of which the anus is often the seat, is also favored by the brisk relaxation induced in the other portions of the abdomen by the sudden emptying of the uterus. If emollient injections, or mild laxatives, do not relieve it, and if venesection is not indicated, the administration of moderate purgatives may be advantageous after the first six or eight days.

B. As *hemorrhoids* are due, in a great measure, to the general irritation about the perineum and pelvis, should they persist beyond the first week, they will require usually a purely antiphlogistic treatment.

§ 3. AFFECTIONS OF THE GENITAL ORGANS.

If *the vagina, or neck of the uterus*, or any other tissues in the excavation, become inflamed to any considerable extent, a heat in the parts, a febrile movement of greater or less intensity, want of appetite and headache, soon come on, and should not be neglected. Deviated positions of the neck or body of the uterus, adhesions, indurations, and deposits of pus, may also occur about the genital organs. Emollient injections into the vagina, hip-baths, leeches to the vulva or neighborhood, bleeding from the arm, if the pulse indicates it, with mild drinks and strict diet, constitute a treatment both preventive and curative.

The *os uteri*, the alterations of which have been well studied by Stoltz, and which is at first soft, large, projecting, as if swollen, open and fringed in the upper part of the vagina, contracts promptly on its uterine side, and is freed of its engorgement below in ten or fifteen days. The slits which almost always take place in the *os uteri* are much reduced by the contraction of the tissue, but as they do not cicatrize smoothly, some traces of them usually remain.

ART. VI.—THROMBUS OF THE VULVA.

The *thrombus* of the labia pudendi, which was noticed by Levret, forgotten by most of the modern writers, pretty well described by Dr. Dewees, and of which I have seen seven or eight cases, may appear at the moment the head is engaging in or clearing the inferior strait, and even in the first two days after the birth of the child, as in the case lately published by M. Wintringer. The tumor sometimes involves both of the labia; more frequently only one is affected. Although in some cases it is from the size of a nut to that of a hen's egg, it is also found to assume in other cases much greater dimensions.

The tissue which folds around the entrance to the vagina, and which constitutes the greater labia, is composed of small veins and arteries, filaments of cellular tissue, and cushions of fat so interlaced and matted together that blood may be thrown out in abundance without extending very far to form a simple ecchymosis. Blows, falls, or any strong pressure inflicted on the vulva, may be followed by a large bloody tumor, which has interested pathologists a good deal, and especially those engaged in the study of obstetrics.

§ 1. NATURE AND FREQUENCY.

Among pregnant women, the stagnation of fluids in the vulva, and the varicose condition of the veins of the vagina, which often exist, may produce this tumor without any external cause. Authors have collected a certain number of cases, which may be found in the memoir of Deneux; but these are only exceptions, which ought not to prevent us from regarding thrombus of the vulva as the result of contusions, and not as the consequence of a simple varicose condition of the veins, as Judas maintains. Besides, it does not always occupy the same situation, for I have met with it in the perineal and pubic extremities on the internal and on the external face of one or the other labia, also on the middle of the mons veneris, and once in the inguinal ring. Dewees has never seen it except on one of the labia, and D'Outrepoint observed it three times on the right side.

Some persons believe that this is an affection peculiar to pregnant women, and Deneux even now says that he has never come across any other case than Hunter's, which belonged to any other condition of the female. It is an error which probably arises from the fact that surgeons have spoken less of it than accoucheurs, at least under the name of bloody tumors, or else because it has been compounded with different tumors. Many examples of it are met with in scientific records, and in daily practice we meet with it no less often.

It is evidently a thrombus of the vulva, which Formi describes under the term *gangrene*, in the following observation:—

A woman thirty years of age had a large tumor on the right labium of the vulva, a tumor which had followed a wound. "Having neglected this injury for three or four days, gangrene at length took place. I directed large and deep incisions to be made in the inside of the vulva; then introducing the hand into these incisions, I removed a pound and a half of grumous blood." The ulcer was healed by the *eau vulnéraire*.

De La Motte states that a lady struck herself so hard on the vulva, against a chair, that a tumor followed of the size of the arm in one of the labia majora, and that no other attention was paid to it than to produce the resolution of the extravasated blood. A young lady, attended by the same author, fell on the corner of a log of wood, and the greater labium of the left side swelled up as big as the fist. He opened the tumor, and "there came from it a large quantity of very black blood, partly coagulated, and partly fluid."

The vulva-uterine thrombus has been frequently observed by others; for, in addition to the three instances which I have mentioned, and nearly sixty others which M. Deneux has collected from Rueff, Kraunauer, and many other authors,

or in his own practice, as well as the twenty-five cases which I myself have met with, many are found in different works, which have escaped the observation of M. Deneux. The tumor, for instance, which Van der Wiel describes under the title of *vaginæ uteri extensio*, and which he treated successfully by incision, was a true thrombus. Deleurye describes two kinds, one by infiltration, and the other by extravasation, which can be relieved only by incision. Denman mentions two cases; and another is met with in the thesis of M. Doudement. Puzos, who says that he has seen several, remarks that the tumor points rather internally than externally, and maintains that it can be easily cured by opening it with the finger, or with a bistoury. Humpage and Baillie also mention it; and, in fact, other cases have been published by MM. Pingeon, Hervez, Levrat, Teallier, Stendell, &c.; so that now it would be easy to collect a hundred detailed observations.

These tumors may afflict women who are not pregnant, since eight have presented themselves at *La Pitié* since the 1st of January, 1833. Two of them were caused by a kick, another by a fall on the shaft of a carriage, a fourth from violent pressure, and the other four, probably, from the abuse of coition. Of this number, I met with no cases in which the tumor was at all degenerated, and of which I spoke when treating of the Transformations of the Blood. Having met with only nine cases during pregnancy or labor, and having, on the contrary, observed fifteen in unimpregnated women, I am disposed to think that women with child are not so subject to them as others.

Women of the town, and those who abandon themselves to venereal pleasures without reserve, have most frequently applied to me. I met with one case in a young girl, aged fourteen years, who had scarcely reached puberty, and who stated that her person had been violated.

§ 2. PROGRESS AND TERMINATION.

During gestation, the thrombus generally acquires a larger size than when it occurs in the unimpregnated condition. As women are backward in complaining of it, the tumor often becomes inflamed, and is frequently confounded with abscess by the practitioner and patient. When inflamed and situated posteriorly near the vagina, it discharges, when opened, clots of blood and pus, mixed together, the one or the other predominating, and emits an odor of fecal matter, which at first might induce the belief that the bistoury had been plunged into a gangrenous abscess of the anus. A young woman, healthy and of large size, proved this to the pupils at *La Pitié*, in May, 1833. The same thing happened in another case, when the bloody collection rendered the application of the forceps necessary for the termination of a labor. The smell came here from the neighborhood of the rectum, or from some other intestine along the walls of the mucous membrane which lines them, and is transmitted to the depositions of blood in the vulva by the same mechanism as in certain cases of abscess about the anus, in the abdominal walls, and even around the mouth, as Fichet de Fléchy has proved. It is well that the surgeon should be forewarned of its possibility, so as not to mistake it for a perforation of the intestine.

Even when there is no inflammation, the bloody deposits in the vulva, formed at the moment of delivery, or a short time after, sometimes cause severe pain. I have seen two patients who were obliged to cry out from it, and Reeve states a case in which fainting was often induced by it. It may, however, on the contrary, as in other regions of the body, remain for a long time without occasioning much suffering. In the *mons veneris*, and in the inguinal portion of the vulva, it does not give rise to so much inconvenience as in the inferior half of the greater labia. Is it not to their degeneration in this situation, when they are not opened, or when they do not burst of themselves, that certain encysted tumors, full of a glairy, reddish, unctuous matter, or of a striated deposit, which I

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